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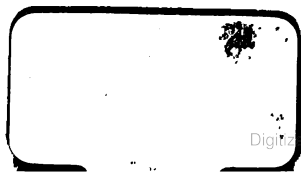
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TO THE

EXECUTIVE DOCUMENTS

OF THE

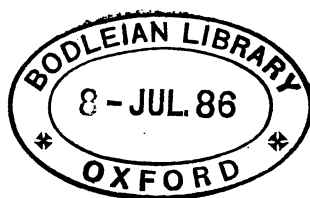
HOUSE OF REPRESENTATIVES

FOR THE

FIRST SESSION OF THE FORTY-EIGHTH CONGRESS,

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ANNUAL REPORT

OF THE

NATIONAL BOARD OF HEALTH.

1883.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1884.

L E T T E R
FROM
THE SECRETARY OF THE TREASURY,
TRANSMITTING
*The Annual Report of the National Board of Health for the fiscal year
1883.*

JANUARY 9, 1884.—Referred to the Committee on the Public Health and ordered to
be printed.

TREASURY DEPARTMENT,
December 4, 1883.

SIR: I have the honor to transmit herewith, in accordance with the
act of June 2, 1879, the report of the National Board of Health, giving
an account of its operations for the fiscal year ended June 30, 1883.

This Department has no recommendation to make concerning the
subject-matter of the report.

Very respectfully, your obedient servant,

CHAS. J. FOLGER,
Secretary.

Hon. JOHN G. CARLISLE,
Speaker of the House of Representatives.

NATIONAL BOARD OF HEALTH.

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STEPHEN SMITH, M. D., &c. *Vice-President.*
CHARLES SMART, Major and Surgeon, United States Army *Secretary.*

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D. C.

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REPORT OF THE NATIONAL BOARD OF HEALTH.

NATIONAL BOARD OF HEALTH,
Washington, November 28, 1883.

SIR: In compliance with the requirements of section 4 of the act approved June 2, 1879, entitled "An act to prevent the introduction of contagious and infectious diseases into the United States," the National Board of Health respectfully submits its fifth annual report, covering the fiscal year ending June 30, 1883, and consequently detailing the operations of the Board under the provisions of the act in question down to the time of its lapse by limitation on the 2d June, 1883.

Statement of the expenditures of the National Board of Health during the fiscal year ending June 30, 1883.

FROM APPROPRIATIONS PRIOR TO JUNE 30, 1882.

Maintenance of inspection service on the Mississippi River	\$3,782 28
Maintenance of Ship Island refuge station	2,500 77
Maintenance of Sapelo refuge station	6,177 83
Maintenance of Elizabeth River refuge station	1,829 08
Inspection of immigrants	6,233 28
Aid to the board of health of Pensacola, Fla.	6,886 85
Investigation into matters relating to the public health	1,826 94
Stationery	12 59
Rent, light, and fuel	125 25
Printing	756 01
Telegrams	65 91
Postage	27 65
Pay and expenses of members of the Board	1,760 00
Pay and expenses of inspectors	750 04
Pay of employés	1,815 88
Miscellaneous expenses	137 31
Total	34,687 67

FROM APPROPRIATION FOR THE FISCAL YEAR ENDING JUNE 30, 1883.

For aid to State and local boards of health	49,947 95
Rent, light, fuel, stationery, telegrams, and postage	1,449 67
Pay and expenses of members of the Board	5,915 94
Pay of secretary, disbursing agent, clerks, &c	4,942 38
Miscellaneous expenses	388 99
Total	62,644 93
Grand total	97,332 60

OPERATIONS OF THE BOARD DURING THE YEAR.

By the provisions of the sundry civil appropriation act of August 7, 1882, the sum of \$50,000, was placed at the disposal of the Board for aid to State and local boards of health and to local quarantine stations in carrying out their rules and regulations to prevent the introduction and spread of contagious and infectious diseases in the United States, and the additional amount of \$17,500 was allowed for all other uses whatever.

This great reduction of the gross amount usually provided for the work of the Board, with an entire omission of any special appropriation for scientific investigations and sanitary surveys and for editing and printing the Weekly Bulletin, made it necessary to hold a special meeting of the Board August 15, to consider the means of accommodating its operations to this unexpected reduction of its available resources. At this meeting it was ordered—

That the executive committee be authorized to continue the immigrant-inspection service, the Mississippi River inspection service, and the service of the refuge stations at Ship Island, Sapelo Sound, and Hampton Roads, until October 1, and that in case the circumstances in New Orleans require it, the necessary number of inspectors and sanitary police may be appointed to make the inspections in that city and give the certificates demanded by the sanitary authorities of the Mississippi Valley, in order to secure safety with the least possible interference with commerce and travel; provided that the strictest economy shall be observed in carrying out all the work thus authorized, and that the expenses shall be reduced whenever practicable.

Before the close of the meeting notice was received from the office of the Surgeon-General of the Army of an order relieving Surgeon J. S. Billings from duty as a member of the Board, and assigning Surgeon Charles Smart to that duty. On the same day Dr. T. J. Turner, medical director, U. S. N., resigned the office of secretary, which he had held since the organization of the Board in April, 1879, and Dr. Charles Smart was elected as his successor in that office. At a later date, namely, June 30, 1883, Dr. Turner was relieved from duty as a member of the Board by an order of the Secretary of the Navy, and on the 17th of October last, Dr. J. M. Browne, medical director, U. S. N., was detailed by the Department to fill the vacancy.

On the 23d of October, 1882, Col. George E. Waring, jr., was appointed by the President as a member of the Board, *vice* Dr. Charles F. Folsom, resigned.

On the 13th of December, 1882, Solicitor-General Phillips was relieved from duty as a member of the Board at his own request, and Assistant Attorney-General Thomas Simons was detailed to represent the Department of Justice.

At the succeeding annual meeting of the Board, June 22, 1883, Dr. Smart, who had discharged the duties of secretary for nearly a year, announced that having been assigned to other important duties by the Surgeon-General of the Army, it would be impossible for him to hold any longer the office of secretary of the Board. The annual election of officers was then held, with the following result:

President—Dr. J. L. CABELL.

Vice-President—Dr. STEPHEN SMITH.

Secretary—Col. GEORGE E. WARING, Jr.

Members of the executive committee (in addition to the above-named *ex-officio* members), Dr. Charles Smart, Mr. Thomas Simons, and Dr. T. S. Verdi.

This annual meeting being held a few days before the close of the fiscal year, and Congress having limited the appropriation for the suc-

ceeding year to the sum of \$10,000 "for pay and personal expenses of members of the Board," it was "resolved that the executive committee be directed to make such arrangements for the care and custody of the official papers, books, office furniture, &c., as it may deem proper and necessary," and in pursuance of these instructions the executive committee ordered that the president and secretary be directed to provide for the care of the property of the Board in Washington and for the transaction of its business, provided the same can be done without expense to the Board.

At the same meeting the following resolution was adopted by the Board:

Resolved, That the National Board of Health respectfully represents to the President of the United States that it has in its custody certain property of the United States, of which a schedule is annexed, procured, and hitherto used for hospital and other purposes in connection with its duties in the prevention of the importation and spread of yellow fever and other contagious and infectious diseases, which it has not been furnished with means to employ after June 30 next for such purposes, or to preserve; and the Board further represents that whereas Congress has placed funds in the control of the President for expenditures in his discretion for such purposes, it deems it right and for the public benefit to tender, as is hereby done, the custody and use of said property to the President for the said purposes, if deemed by him advisable, and in order that the same may be employed and preserved for the public good, but with the understanding that the said property shall be kept in as good condition as when delivered, and returned to the Board whenever Congress shall enable it to use and preserve the same for the purposes for which it was procured.

This resolution was communicated to the President, and by him referred to the Secretary of the Treasury, with instructions to take such action as he might deem proper. Accordingly, the Board of Health received notice July 3, by a communication from the Hon. John C. New, assistant secretary, that he had directed the Surgeon-General of the Marine Hospital Service to assume charge of the property, and requesting that appropriate measures be taken immediately for the transfer of the same to persons coming with authority to receive it.

OPERATIONS OF THE BOARD IN AID OF LOCAL QUARANTINE STATIONS.—MARITIME QUARANTINE.

In former annual reports the views of the Board with respect to the least expensive method of rendering to the health authorities of the maritime ports such aid as was required by the provisions of the third section of the act approved June 2, 1879, have been fully stated. In accordance with these views, and in pursuance of the above-cited order of the Board, the executive committee arranged a schedule of operations embracing a continuance of the service of refuge stations at Ship Island, Sapelo Sound, and Hampton Roads, on the basis of the greatest economy consistent with the efficiency of this service as a means of preventing the introduction of contagious and infectious diseases into the United States by sea. It was at first intended to close these stations on the 1st October, but before that period arrived it had become evident that the presence of yellow fever patients in the hospital on Ship Island, and of infected vessels in its quarantine anchorage, would necessitate a modification of the order issued by direction of the Board, and the executive committee sought and obtained discretionary authority to extend the several services enumerated in the resolution of the Board to such time as the exigencies of the public health might require.

In the case of Ship Island, when preparations were in progress for closing the service on the 20th October, it was further extended for the reception of the Austrian bark Arno, in compliance with the request made in the following communication from the Secretary of State:

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DEPARTMENT OF STATE,
Washington, October 18, 1882.

SIR: I transmit herewith, for your information, copy of a note from the minister of Austria-Hungary at this capital, of the 17th instant, relative to the arrival at the quarantine station at Ship Island, from Pensacola, of the Austrian bark Arno, with four cases of yellow fever on board.

In view of the statement that the station is to close on the 20th instant, and of the Baron Von Schaeffer's request that it may remain open until the sailors who are affected are convalescent, I have to submit the matter for such action as you may properly take therein, and to ask that I may be apprised thereof when taken.

I am, sir, your obedient servant,

FRED'K T. FRELINGHUYSEN.

J. L. CABELL, M. D.,

President National Board of Health, Washington, D. C.

WASHINGTON, *October 17, 1882.*

SIR: I have just received the following telegraphic dispatch from our consul in New Orleans, La.:

"Austrian bark Arno, having four yellow fever cases on board, arrived quarantine station Ship Island from Pensacola. Physicians there state station will close 20th instant. Prevail upon secretary National Board of Health to keep open until convalescence of sailors."

Would you kindly interfere at the National Board of Health in order to obtain the compliance with the demand contained in the above dispatch.

Accept, sir, with my anticipated thanks, a renewed assurance of my highest consideration.

SCHAEFFER.

The station was finally closed November 15, and the operations here referred to were included in the final report of Dr. T. S. Scales, to be found in Appendix G of the last annual report of the Board for 1882.

Congress having failed to make provision in the appropriation act approved March 3, 1883, for continuing the service hitherto rendered by the National Board of Health in aid of the local quarantines, the duty devolved upon this Board to make the best practicable disposition of the remnant of its funds for the protection of the ports most exposed to the danger of importation of yellow fever until the commencement of another fiscal year, when the epidemic fund of \$100,000, placed at the disposal of the President, would become available to that end. Accordingly, when it was found at the executive meeting on the 2d May, 1883, that there was on hand an unexpended balance of \$8,170.70 for preventing the introduction and spread of epidemic diseases, it was ordered that the refuge stations be opened without delay, and the service be commenced on the basis of the previous season, and be continued to the close of the fiscal year.

For the details of the operations at Ship Island and at Sapelo Sound, down to the time of their transfer to the Marine Hospital Service, reference is respectfully made to the report of Dr. T. S. Scales and Dr. W. H. Brunner, transmitted herewith as Appendix A, which also contains an elaborate report by Dr. William Martin, assistant surgeon, U. S. N., on the origin of the yellow fever epidemic in Pensacola in the autumn of 1882.

The hospital barge Selden was also placed in commission in Hampton Roads, but no case of infectious disease had appeared at the station down to the period of transfer early in July of the present year.

QUARANTINE INSPECTION AT FOREIGN PORTS OF DEPARTURE.

In the annual report for 1882 it was stated that certain important provisions of the law of June 2, 1879, specified in parts of sections 3 and 4, and required to be enforced by the consular officers of the United

States at foreign ports, were rendered inoperative by reason of the clause in section 3, which provides:

That none of the penalties herein imposed shall attach to any vessel, or owner or officer thereof, till the act and the rule and regulations made in pursuance thereof shall have been officially promulgated for at least ten days in the port from which said vessel sailed.

To meet the difficulty arising from the refusal of the local authorities in foreign ports, where infectious diseases prevail, to permit this promulgation to take place, or otherwise to co-operate with the consular and medical officers of the United States, the International Sanitary Conference of Washington was called to consider the means of securing an international system of notification as to the actual sanitary condition of ports and places under the jurisdiction of the several parties to the conference, and of all vessels sailing therefrom.

Very important concessions of international comity, having for their object the adoption of such precautionary measures at the ports of departure as would obviate to a great extent the necessity of vexatious delays by the quarantine regulations at the ports of arrival, were recommended by the conference; but as no steps were subsequently taken towards framing a convention based upon the resolutions of the conference, the difficulty which impeded the execution of the law of June 2, 1879, still remained, and was a source of extreme embarrassment and annoyance to the consular officers of the United States, who desired to discharge faithfully and efficiently the important duties imposed by the acts in question.

The following correspondence between this Board and the State Department, relative to a dispatch of the consul of the United States at Funchal, presents a specimen of many similar complaints, and will serve to show how largely the interests of the public health are placed in jeopardy by the continuance of a difficulty which may be so easily removed:

DEPARTMENT OF STATE,
Washington, February 3, 1883.

SIR: I send you inclosed a copy of a dispatch, number 35, from the consul of the United States at Funchal, making certain inquiries in regard to the issuance of bills of health.

I will thank you for a full reply to this dispatch, so that the Department can answer the consul's questions.

The entire subject referred to in the accompanying dispatch is one of great embarrassment to the Department and to consuls. The several State health officers do not seem to require the production of bills of health by masters of vessels arriving from foreign ports, and the masters then complain that the consular officers require them to procure a useless document and to pay a fee therefor.

I am, sir, your obedient servant,

JOHN DAVIS,
Assistant Secretary.

DR. JAMES L. CABELL,
President of the National Board of Health, Washington.

No. 35.]

UNITED STATES CONSULATE,
Funchal, January 8, 1883.

SIR: I have the honor to inclose herewith a bill of health according to the form (No. 36) filled in as many points as the circumstances of this port and the negligence of the officials will allow. The inclosed bill of health is a sample of those I am accustomed to give ship-masters. I respectfully ask to be informed whether such a partially filled document is satisfactory to the Department. If it is not, I respectfully request to be informed whether section 364 (Consular Regulations) means that the consul is personally to inspect every vessel to which he gives a bill of health. The phrase "when it shall be necessary * * * under instructions," &c., refers, I suppose, to consular action in the case of an infected port (Rules and Regulations, No.

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11). There is no instruction as to how the consul is to discover whether the vessel is infected or not. Disease might easily have broken out during the vessel's stay, and might have been concealed from the local authorities.

Again, the bill of health, as per inclosure No. 1, requires that the sanitary history of the vessel be stated, cargo, crew, passengers, &c., and that this history be certified to by the medical officer. Supposing the Department to require this medical signature, and the ship-master to refuse (as he most likely would) to pay the necessary \$5 more, shall the consular officer regard this as equivalent to a refusal to take a bill of health, and be guided by the last sentence of section 362, or shall he grant a foul bill of health?

When questioned by ship-masters I have been unable to tell them why they are required to take a bill of health in duplicate. My conjecture is that one is for the "health officer at the quarantine station" and the other for the "collector of customs" (section 358). On this point also I respectfully request information.

If every vessel is to be inspected medically or by the consul in person, instead of getting this bill of health as now simply from information supplied by the captain, I would call attention to the utter impracticability of consular officers carrying out the suggestion contained in the last sentence of rule 5. Even in so small a port as Funchal this would be impossible.

I am, sir, your obedient servant,

L. DU PONT LYLE,
Consul.

Hon. JOHN DAVIS,
Assistant Secretary of State, Washington.

No. 8783.]

(Form 36.)

[Port of Funchal]

UNITED STATES OF AMERICA.

BILL OF HEALTH.

I, L. Du Pont Lyle, consul at the port of Funchal, do hereby state that the vessel hereinafter named clears from this port under the following circumstances:

Name of vessel, Tamerlane.

Tonnage, 908.

Apartment for passengers, No. ———.

Destination, New York.

Name of medical officer (if any), ———.

Total number of passengers: First cabin, ———; second cabin, ———; steerage, ———.

Nature (vessel of war, ship, schooner, &c.), ship.

Guns, ———.

Where last from, Cardiff.

Name of captain, Smith.

Total number of crew, 16.

Cargo, ballast.

Vessel.

1. Sanitary history of the vessel, ———.
 2. Sanitary condition of vessel (before and after reception of cargo, with note of any decayed wood). Note disinfection of vessel:
 3. Sanitary condition of cargo,
 4. Sanitary condition of crew,
 5. Sanitary condition of passengers,
 6. Sanitary condition of clothing, food, air-space, and ventilation,
- } Good.

Port.

1. Sanitary condition of port and adjacent country:
 - a. Prevailing disease (if any), ———.
 - b. Number of cases of and deaths from yellow fever, Asiatic cholera, plague, small-pox, or typhus fever during the week preceding ———
- Number of cases of—
 - Yellow fever, ———.
 - Asiatic cholera, ———.
 - Plague, ———.
 - Small-pox, ———.
 - Typhus fever, ———.

Number of deaths from—

Yellow fever, _____.
 Asiatic cholera, _____.
 Plague, _____.
 Small-pox, _____.
 Typhus fever, _____.

c. Population according to the last census, about 30,000.

d. Total deaths from all causes during the preceding month, _____.

2. Any circumstances affecting the public health existing in the port of departure to be here stated _____.

I certify that I have personally inspected the said vessel and that the above statements are correct.

(Signature of medical officer:)

I certify that the foregoing statements are made by _____, who has personally inspected said vessel; that I am satisfied that the said statements are correct; and I do further certify that the said vessel leaves this port, bound for New York, in free pratique.

In witness whereof I have hereunto set my hand and the seal of office at the port of Funchal, this 5th day of January, 1883, 10.45 o'clock a. m.

[SEAL.]

L. DU PONT LYLE.

NATIONAL BOARD OF HEALTH,
 Washington, February 10, 1883.

SIR: I have the honor to acknowledge the receipt of your communication of the 3d instant, inclosing a copy of a dispatch from our consul at Funchal, making certain inquiries in regard to the issuance of bills of health, and requesting a full reply, that the Department may answer the consul's questions.

The embarrassments which have attached to this subject have, in the opinion of this Board, arisen from a misunderstanding of the provisions under the first three sections of the act approved June 2, 1879, entitled "An act to prevent the introduction of contagious or infectious diseases into the United States."

Congress in passing this act considered that it was placing certain powers and facilities at the disposition of the National Board of Health, when in reality this was not the case, as that part of the first section which imposes a penalty on vessels from an infected foreign port entering or attempting to enter a port of the United States in violation of the act became inoperative on account of the proviso in the third section, the influence of which was not foreseen.

To meet this difficulty the Board has repeatedly asked for an amendment of the act in question, as originally suggested by the National Academy of Sciences in its report to Congress of December 27, 1879. It was proposed that "the act be so amended that in order to enforce the penalties provided in that act for vessels which shall enter or attempt to enter ports of the United States in violation thereof, it shall not be necessary to show that the port of departure was, at the precise time of the departure of such vessel, actually infected with contagious or infectious disease, nor that ten days' official promulgation in the port from which such vessel sailed should have been effected. It seems preferable that all vessels from foreign ports coming to ports in the United States shall be required to have bills of health." (See Annual Report National Board of Health, 1879, p. 7, par. 5.)

No action has ever been taken by Congress on this proposed amendment, and as, therefore, no compulsion can be exercised by the National Board of Health to effect the carrying out of the law, the first rule in the circular issued from the Department of State January 4, 1882, a copy of which is inclosed, calls for a bill of health from all vessels sailing from an infected foreign port for any port in the United States, but makes no mention of any penalty for violation. The fourth rule of the circular directs the consular officer to make or cause to be made, upon the request of the master, owner, or agent, an inspection of every ship or vessel bound for any port in the United States, and give the bill of health required by these regulations. It was believed that in many cases in which there might be a doubt or difference of opinion as to the actual or threatened infection of a port, masters of vessels about to sail for the United States might desire such a certificate from the consular officer as would be likely to satisfy the authorities of the port of destination, and hence might request the necessary inspection to be made. In such a contingency Rule 4 makes it the duty of the consul to make such examination, and thereon furnish the said bill of health.

The State and local quarantines of this country may, by their rules, detain vessels from an infected port for a longer or shorter period, and through the enforcement of their rules, in the absence of a penalty to be recovered by proceedings in the proper district court of the United States, it was anticipated that masters, owners, or agents would seek the bill of health from the consular officers at the foreign ports when those ports were infected or suspected of infection.

From correspondence in the office of the secretary of this Board, it is found that some consuls have considered the issuance of bills of health as mandatory upon them instead of being called for only on the request of the masters, owners, or agents. Other officers, again, seem to regard the bills of health as called for, whether the port is or is not infected, whereas the act of June 2, 1879, and the rules issued in accordance with its provisions, have a reference only to ports which are infected or to which the suspicion of infection has attached.

Mr. Lyle transmits a partially filled bill of health, and requests to be informed whether it is satisfactory. On it the sanitary condition of the vessel, cargo, crew, &c., is reported as good; nothing is said as to the presence of infection at the port; but as Mr. Lyle admits the vessel to be free *pratique*, it is to be inferred that the port of Funchal was at that date free from infectious diseases. The bill of health is, therefore, satisfactory, although it does not show why the master, owner, or agent was induced to request the consul to make the examination and furnish the bill of health. A statement that the port had on a given date become free from cholera, yellow fever, &c., as the case may have been, or that the vessel had once had a bad sanitary history, would have explained this, but as this is not given, and as Mr. Lyle inquires what is to be done in case the shipmaster declines to pay for a medical examination if such is deemed necessary, it seems doubtful whether the request of the master, owner, or agent was a prelude to the issuance of this bill of health.

The refusal to pay for the medical examination would be equivalent to the withdrawal of the request for the inspection, and the consul would be relieved from further concern in the matter, unless he recognized a danger to the United States in the condition of the vessel, when it would be proper for him, in accordance with 362, Consular Regulations, to notify the facts to the National Board of Health and to the health officer of the port of destination.

Rule 17 of circular of January 4, 1882, will enable the consul to obtain information as to the condition of the vessel.

Presumably, Mr. Lyle's conjecture as to the necessity for duplicate bills of health is correct (358, Consular Regulations).

Lastly, Mr. Lyle invites attention to the utter impracticability of consular officers carrying out the requirement that vessels carrying a foreign flag shall be inspected, when practicable, in company with the consul or consular agent of the nation to which the vessel belongs.

If the qualifying phrase, *when practicable*, found no place in this rule, Mr. Lyle's criticism would be justified, but as it stands the impracticability is removed.

I have the honor to be, very respectfully, &c.,

JAMES L. CABELL,
President National Board of Health.

Hon. JOHN DAVIS,
Assistant Secretary of State, Washington, D. C.

Thus it will be seen that though the consular officer could not compel the owner of vessels sailing under a foreign flag to submit to the requirements of the law enacted in this country, yet in numerous cases the "master, owner, or agent" would "request" the consular officer to make the prescribed inspection in order to avoid anticipated restraints at the ports of destination in the United States, as all vessels desiring to enter these ports would be subject to their quarantine rules and regulations. In many other cases, however, it appears that the quarantine authorities at some of our home ports have been in the habit of giving *pratique* to vessels provided with clean bills of health furnished by the local authorities at foreign ports of departure. As a general rule such bills of health are absolutely worthless. A clean bill of health was sent to the office of the National Board of Health by the quarantine officer of the port of Baltimore, who had received it from a vessel bound to that port, upon which it was stated "that the port" (of departure) "and its environs are free from the suspicion of contagious and infectious diseases, especially yellow fever." This bill was duly signed by the local authorities of the foreign port, and issued under the seal of the office, whilst at the same time the sworn statement of another officer cited over eighty cases of yellow fever, with thirty-four deaths, during the week preceding the date of the bill of health. In view of such facts Congress wisely decided to require all vessels sailing from any foreign port where

any contagious or infectious disease exists to obtain a bill of health from the consular officer of the United States at such port, and to hold said officer responsible for the accuracy of the certificate.

INTER-STATE QUARANTINE.

1. *Mississippi River inspection service.*

The character and the value of this service of sanitary inspections at various points on the Mississippi River, as a substitute for the restrictions of a system of inter-State quarantine, have been explained in former annual reports of this Board. At an early period of the spring inquiries were addressed to the secretary of the Board from various parts of the Mississippi Valley as to the probability of the resumption of the service during the approaching yellow-fever season. These were answered by the following official communication :

WASHINGTON, March 26, 1883.

DEAR SIR: Inquiries having been received at this office concerning the action to be taken by the National Board of Health during the yellow-fever season, I have been instructed to communicate to you the intentions of the Board so far as they can be formed with certainty under present conditions.

The law of 1879, under which the Board maintains its refuge stations at Ship Island, Mississippi, Sapelo Sound, Georgia, and Elizabeth River, Virginia, and its inspection service at New Orleans and on the Mississippi River, will expire June 2 next.

There has, however, been appropriated by the sundry civil appropriation bill of March 3 last the sum of \$100,000, to be used by the President in case of an actual or threatened epidemic in aid of State or local boards, or otherwise, in his discretion, for preventing or suppressing the disease, and maintaining quarantine at points of danger.

As the Board has the authority and the means to open its stations in aid of State and local boards for the prevention of the introduction and spread of yellow fever, it proposes to do so some time in May next, to co-operate with the local authorities as heretofore, and to continue the work until its authority shall have expired. If, in the mean time, the President should come to the assistance of the Board with the epidemic appropriation placed at his disposal, the work can be continued until the close of the season of danger; but should the Board be disappointed in this, its power to aid will cease, and State and local authorities will have to take such action in the case as may seem good to them.

I am, sir, with much respect,

CH. SMART,

Major and Surgeon, U. S. A., and Secretary National Board of Health.

Dr. J. H. PURNELL,
Secretary of Board of Health, Memphis, Tenn.

In accordance with this pledge the service was opened May 15, 1883, under the supervision of Dr. G. B. Thornton for the river above New Orleans, and of Dr. S. M. Bemiss at and below that city. Its operations were limited to the inspections at New Orleans, at the Mississippi quarantine, and to a single station on President's Island, a few miles below Memphis, on land belonging to that city, which was offered by the civil authorities, with a request that the inspections should be carried on there as during the three previous seasons. It was intended also to re-establish the Vicksburg station, if this should be called for by the local authorities, but before any such demand had been made the State board of health of Mississippi decided, with the approval of the governor, to establish an inspection station at or near the southern limit of the State along the line of the river. This action superseded the necessity for reopening the station near Vicksburg, which, in the two preceding seasons, had presented extraordinary difficulties of administration, the inspectors and most of the other employes having

been completely disabled before the season was half over on each occasion, owing to the extreme insalubrity of the locality. The actual operations of the service during the month of June are stated in the reports of the inspectors in Appendix B.

The health authorities of the Mississippi Valley States were so well convinced of the importance of this service that a special meeting of the "Sanitary Council of the Mississippi Valley" was held in Jackson, Miss., April 3 and 4, to consider the means of securing such co-operative action that "commerce and travel should escape the interferences from conflicting and irresponsible local quarantines which obtained prior to the inauguration of the inspection service of the National Board of Health."

In addition to the regular members of the council, representatives of the leading commercial, transportation, and industrial interests of the valley were invited. In response to the invitation quite a number of these classes attended and participated in the proceedings, which resulted in the adoption of the following preamble and resolutions recommended by a committee appointed for the purpose, and consisting of one delegate from each of the ten States represented in the Council:

Whereas, it is the sense of the Sanitary Council of the Mississippi Valley that the National Board of Health possesses to the fullest extent the confidence of the States of the valley: It is therefore

Resolved, That a committee be appointed by the president of this council to petition the President of the United States to place the \$100,000 epidemic fund in the hands of the National Board of Health for disbursement in case its use is demanded.

Resolved, That in case the National Board of Health is deprived of the power of making inspections of persons and freight when demanded by the local boards of health, certificates issued under the supervision of a representative or representatives of the Sanitary Council of the Mississippi Valley shall be accepted as valid by the boards of health of the Mississippi Valley, provided that said inspections be carried on under the rules and regulations heretofore prescribed by the National Board of Health.

Resolved, That the Sanitary Council recommends that the States of the Valley make voluntary contributions, to be expended under the direction of the executive committee of this council, to continue river and rail inspections, in the event that no funds are placed in the hands of the National Board of Health for that purpose.

Resolved, That the Sanitary Council recommends, for the guidance of the health organizations of this valley, the system of inspection, isolation, disinfection, and quarantine heretofore prescribed by the National Board of Health.

Resolved, That the communication of the Louisiana State board of health be received in the spirit in which it is tendered, and that its co-operation with the Sanitary Council of the Mississippi Valley, in protecting the valley from epidemic diseases, will be cordially approved and acknowledged.

All of which is respectfully submitted.

R. C. KEDZIE, *Chairman*, Michigan.

B. M. GRIFFITH, Illinois.

W. H. DICKINSON, Iowa.

JOS. SPIEGELHALTER, Missouri.

G. B. THORNTON, Tennessee.

J. A. DIBBLELL, JR., Arkansas.

H. G. JONES, Indiana.

W. T. HYER, Mississippi.

L. C. CARR, Ohio.

W. W. DANIELLS, Wisconsin.

D. C. HOLLIDAY, *Secretary*.

The following draft of the memorial to the President of the United States, authorized at the morning session, was submitted by the committee:

To the President:

We, a committee appointed by the Sanitary Council of the Mississippi Valley, at its fifth annual meeting, in the city of Jackson, April 3-4, 1883, do humbly but sincerely

petition that the fund of \$100,000, to be used, with your approval, in the event of an outbreak of yellow fever or other epidemic disease on the coasts of our country, be placed at the disposal of the National Board of Health.

That body can give confidence to the people of the valley as to the necessary precautions and safeguards yearly demanded by the exposure of our Southern ports to the ravages of yellow fever. Their inspection stations and the mode their officers have adopted in isolation and disinfection, establishing quarantine only when emergency or occasion demands it, have earned for the National Board a degree of confidence that, of itself alone, is worth millions of dollars to the commerce of the country.

To supplant this body or withhold from it the necessary funds to maintain inspection stations at all exposed points will, in our humble judgment, clog the wheels of commerce by bringing about a feeling of distrust on the first alarm, be it true or false, and cause recourse to the shot-gun policy of quarantine, which can but prove destructive to the commercial interests of the Mississippi Valley, which in a measure affect those of the entire Union.

With these views, submitted with full faith in your judgment, and appreciation of the solicitude you must feel for the welfare of the public health, we herewith subscribe ourselves your most humble petitioners.

On motion, the draft of the memorial was approved, and it was ordered to be engrossed and signed by the delegates from the States of Ohio, Indiana, Illinois, Kentucky, Iowa, Tennessee, Missouri, Michigan, Wisconsin, Louisiana, Arkansas, and Mississippi, and to be forwarded to the President at Washington.

After it was ascertained that the National Board of Health would be unable to continue the service beyond the 30th June, the executive committee of the council took action as follows:

At a meeting of the executive committee of the Sanitary Council of the Mississippi Valley, held in Memphis this 21st day of June, 1883, the following members were in attendance: Dr. Wirt Johnston, of Mississippi, president; David P. Hadden, of Memphis, vice-president; Dr. John H. Rauch, of Illinois, secretary. Dr. G. B. Thornton, president of the Memphis board of health, and member of the Tennessee State board, was also present by invitation. After thoroughly canvassing the situation, which up to this date was considered altogether encouraging, the following preamble and resolutions were adopted:

Whereas the inspection service now conducted by the National Board of Health in the Mississippi Valley will cease on the 30th of June on account of want of funds for its further maintenance; and

Whereas the commercial welfare, no less than the health interests, of the valley demands that these precautions be continued during the summer months: therefore, be it

Resolved, That the supervision of this service from and after June 30 be assumed by the Sanitary Council of the Mississippi Valley, in accordance with the action of the council had at its fifth annual meeting, in the city of Jackson, Miss., April 3 and 4, 1883.

Resolved, That the inspection station now maintained by the National Board of Health below Memphis be continued at the expense of the taxing district government of Memphis.

Resolved, That the Mississippi State board of health should establish and maintain an inspection station on the Mississippi River, at some point between Vicksburg and the Louisiana State line.

Resolved, That the present corps of inspectors of the National Board of Health, on duty at the Mississippi River quarantine station below New Orleans and on the river and railroads at New Orleans, be continued, under direction of the executive committee, from and after June 30.

Resolved, That the rules and regulations of the National Board of Health, for the conduct of this inspection service, be, and the same are hereby, adopted for its further continuance under the direction of the Sanitary Council.

Resolved, That the supervision of this service, on behalf of the executive committee, be assigned to the secretary of the council, Dr. John H. Rauch, Springfield, Ill., to whom all reports of inspectors and communications pertaining to the service should be addressed.

2. Immigrant inspection service..

It was intended, in view of the limited means at the disposal of the Board, to close this service at the earliest period at which it could be done, without too great risk of injury to the public health from the

transportation of large masses of immigrants recently arrived from infected foreign ports, and it was hoped that this might be safely done by the 1st of October. Facts were, however, submitted to the Board by the health authorities of New York, Michigan, and Illinois, which left no room for doubt that the danger of the dissemination of small-pox by immigrants from Europe and Canada was for the present constant and urgent, and an order was issued extending the service, at a reduced scale, to the 15th of December, in the hope that by that time, if the danger still existed, Congress would, by joint resolution or otherwise, make a special provision for the relief of those States upon which the burden of protecting the neighboring States was falling to so unequal an extent.

The health authorities of the States above mentioned were so fully impressed with the magnitude and urgency of the danger that in the early part of November this Board received from each of them the most urgent requests for removing the limitation as to the continuance of the service, and when informed that the means at the disposal of the Board precluded the possibility of an indefinite continuance, they requested a conference with the Board. Notice was then given them that the annual meeting of the Board had been appointed for the 12th of December, and the parties requesting the conference were invited to attend. On the day appointed the following-named gentlemen, who had suggested the conference, appeared before the Board and made earnest statements as to the importance of continuing the service: Dr. William M. Smith, health officer, port of New York, and member of the State board of health; Dr. H. B. Baker, secretary State board of health of Michigan; Dr. H. R. Mills, inspector of immigrants at Port Huron, Mich., and Dr. J. H. Rauch, secretary State board of health of Illinois.

It was stated by the health officer of the port of New York, whose official position gave him the best opportunity of coming to sound and trustworthy conclusions, that vaccination practiced on board ship and at the quarantine station in the harbor of New York, though of great value, does not wholly remove the danger; that under the laws of the State of New York he could not detain immigrants or use other coercive measures, unless there had been an actual development of small-pox on the vessel during the transit; that this did not often occur, while it was quite common for parties in the incubative period of the disease to pass quarantine when there had not been any development of disease, which alone would authorize their detention; and that these parties thus affected with the disease passed through the State into the interior States establishing foci of contagion in various quarters. He had solicited an interview with the National Board of Health in order to discuss this matter and to invite its aid.

Dr. Rauch in this connection referred to two recent occurrences in illustration of the views presented by Dr. Smith. An epidemic had recently occurred at Davenport, Iowa, caused by an immigrant arrival by the steamship Cymbria; seventy cases had occurred at a cost of near \$30,000. He also stated that the steamship Hermann had brought passengers who had infected five points in Illinois.

The gentlemen present were requested to submit a report in writing representing their views and the views of the responsible authorities of the several Northwestern States chiefly interested in this matter. On the following morning they presented the following statement, signed by themselves and others, whose consent they obtained by telegraph,

which consent was subsequently confirmed by letters sent through the mail:

WASHINGTON, December 12, 1882.

To the National Board of Health:

GENTLEMEN: The undersigned respectfully represent that the maintenance, at the principal ports of entry in the United States, of an efficient sanitary inspection of immigrants as to their protection from small-pox, and as to their liability to communicate that disease, is necessary to prevent the frequent introduction of small-pox and other contagious disease among the people of this country; and that such inspection is necessary to secure efficient action at ports of departure and on board ships on the part of the transatlantic steamship lines engaged in the transportation of immigrants.

There is also urgent need for constant watchfulness to detect contagious disease occurring in immigrants after they have passed the ports of entry—the disease not having appeared when they were examined at the port of entry.

We therefore urge upon you the necessity for continuing such inspections as have been established.

This inspection service is such that its benefits have no relation to State boundaries, but its protective influences extend widely throughout this country; consequently, expenses therefor should not properly be borne by any local or State board of health. We believe that it is the duty, and one of the highest duties of the National Government to maintain this inspection service whenever needed in this country.

In our opinion the sum of \$25,000 will be sufficient for this service during the remaining months of this fiscal year.

WM. M. SMITH,
Health Officer, Port of New York.
JOHN H. RAUCH,
Secretary State Board of Health of Illinois.
H. R. MILLS, M. D.,
Inspector of Immigrants at Port Huron, Mich.
HENRY B. BAKER,
Secretary Michigan State Board of Health.

We concur in this report and the recommendations.

ROBERT MARTIN, M. D.,
Commissioner of Health, Milwaukee, Wis.
OSCAR C. DEWOLF, M. D.,
Commissioner of Health, Chicago, Ill.
R. J. FARQUHARSON, M. D.,
Secretary State Board of Health, Iowa.
W. W. CANTWELL, M. D.,
Health Officer, Davenport, Iowa.
C. C. CRAIG, M. D.,
Commissioner of Health, Rock Island, Ill.
W. B. CONERY, M. D.,
Saint Louis Board of Health.
E. M. HUNT, M. D.,
Secretary State Board of Health, New Jersey.
T. L. NEAL, M. D.,
Health Officer, Dayton, Ohio.
ELISHA HARRIS, M. D.,
Secretary State Board of Health, New York.
W. SNIVELY, M. D.,
City Physician, Pittsburgh, Pa.
J. E. REEVES, M. D.,
Secretary State Board of Health, West Virginia.
JOHN J. SPEED, M. D.,
Secretary State Board of Health, Kentucky.
O. W. WIGHT, M. D.,
Health Officer, Detroit, Mich.
THAD. M. STEVENS, M. D.,
Secretary State Board of Health, Indiana.
E. S. ELDER, M. D.,
Health Officer, Indianapolis, Ind.
J. T. REEVE, M. D.,
Secretary State Board of Health, Wisconsin.

On the receipt of this paper the Board adopted the following resolutions:

Resolved, That the statement submitted expresses, we believe, the opinion of the more prominent sanitarians of the North and West upon the subject of immigrant inspection, and seems to this Board eminently wise and just.

Resolved, That the President transmit a copy of it to the President of the Senate, Speaker of the House of Representatives, and to the chairmen of the Committees on Public Health of the House and Senate.

In accordance with the second resolution, copies were transmitted December 13 to the several officials therein named, and on the following morning action was taken in each branch of Congress by an order to print and a reference to the appropriate committee.

At this meeting it was decided to exempt certain inspectors, at the points of greatest danger, from the operation of the general order which had been previously issued for the discontinuance of the service on the 15th December. These points were the ports of New York, Baltimore, and Port Huron. At each of these places one inspector was to be retained until further orders. The inspectors at Baltimore and Port Huron were finally relieved on the 31st of May, 1883, the inspections at New York having been discontinued April 30, in consequence of the resignation of the inspector.

For the details of the working of this service, as set forth in the reports of the inspectors, and some other documents relating to it, reference is respectfully made to Appendix C.

SUMMARY OF FOUR YEARS' WORK UNDER THE PROVISIONS OF THE ACT APPROVED JUNE 2, 1879.

Much the greater part of the operations of the National Board of Health during the four years ending June 2, 1883, consisted in measures of co-operation with State and municipal boards of health in the execution and enforcement of quarantine regulations, to prevent the introduction and spread of contagious diseases, in conformity with the provisions of the act approved June 2, 1879. That act having now expired by its own limitation, it is deemed proper and expedient to present a summary review of the work of the Board during the four years that it was in force.

A brief preliminary notice of what had been done, or attempted to be done, prior to its enactment, in the way of national legislation on the subject of quarantine, will serve to indicate the special difficulties which confronted the Board at the very outset of its career.

As early as May, 1796, just after a widespread epidemic of yellow fever of great severity, a bill was reported in the Fourth Congress, sitting in Philadelphia, to regulate quarantine. It consisted of the two following sections:

1. *Be it enacted, &c.*, The President of the United States be and is hereby authorized to direct at what place or station in the vicinity of the respective ports of entry within the United States, and for what duration and particular periods of time, vessels arriving from foreign ports and places may be directed to perform quarantine.

2. *Be it enacted, &c.*, That the President of the United States be and is hereby authorized to direct the revenue officers and the officers commanding ports and revenue cutters, to aid in the execution of quarantine, and also the execution of the health laws of the States, respectively, in such manner as may appear to him necessary.

The first section, which clothed the President with a certain degree of independent authority—the authority, namely, to declare and regulate quarantine—was strongly opposed by Representatives from Penn-

sylvania, Rhode Island, Virginia, Georgia, New York, Massachusetts, and North Carolina, and finally stricken out by a vote of 46 to 23, exactly two to one.

The bill, divested of the obnoxious section, passed in the House of Representatives May 23, 1796. In the Senate the committee to which it was referred reported an amendment to insert after the word "that" the words "until general regulations relative to quarantine are made by law," and this amendment was adopted by that body, but the House of Representatives refused to concur, as the amendment implicitly asserted the power of the General Government to regulate quarantine. The bill finally passed without amendments, but also without the first section, and was approved May 27, 1796.

In the third session of the Fifth Congress a bill "respecting quarantine and health laws" was reported from the Committee on Commerce of the House of Representatives by Mr. Smith, of Maryland. After being amended by the addition in the Senate of another section, it finally passed both bodies as amended, and was approved February 25, 1799. Its provisions, superseding those of the act of May 27, 1796, which act was formally repealed, are still in force. In this act Congress not only abstains from the assertion of any authority to regulate quarantine, but distinctly and fully recognizes the actual possession and exercise of such authority by the States, and requires that it shall be respected by the officers of the customs revenue of the United States, by the masters and crews of the several revenue cutters, and by the military officers commanding in any port or station on the sea-coast; and, furthermore, directs that "all such officers of the United States shall faithfully aid in the execution of such quarantine and health laws, according to their respective powers and within their respective precincts, and as they shall be directed from time to time by the Secretary of the Treasury." (Revised Statutes, sec. 4792.)

In 1872 a joint resolution of the Senate and House of Representatives, "for a more effective system of quarantine on the Southern and Gulf coasts," was approved June 6 of that year. By this resolution the Secretary of War was directed to detail one or more medical officers of the Regular Army to visit each town and port on the coast of the Gulf of Mexico and on the South Atlantic coast, and to inquire whether any system of quarantine is likely to be effective in preventing invasions of yellow fever, and, if so, what system will least interfere with the interests of commerce at said ports.

Dr. Harvey E. Brown, U. S. A., was detailed for this duty, which he discharged with great ability, and having clearly demonstrated the value of quarantine, he recommended the substitution of national for local quarantines. This led to the introduction, in the winter of 1873-74, immediately following the yellow fever epidemic of the preceding summer, of a bill by Hon. Mr. Bromberg, for a national quarantine, which passed the House of Representatives, but failed in the Senate. This bill provided for the formation of a quarantine board to consist of the Surgeon-Generals of the Army, Navy, and Marine Hospital Service respectively, whose duty it should be to prepare quarantine regulations, which were to be enforced by an officer from one of these services to be detailed for that purpose. Its failure in the Senate was apparently brought about by a few remarks from Senator Thurman, who said:

It is a question of very great consequence, and I see that the committee in reporting the bill have felt that, and therefore provided that the regulations to be made under the act shall not interfere with the regulations of the several States. But it seems to me that there is very great difficulty in that, for the health regulations of

the States are different one from the other. How this Board is to make any general regulations that will be effective and not interfere with the State regulations, I do not clearly perceive.

The next attempt at the establishment of a national system of quarantine was in 1878, when Congress, impelled by the recollections of recent disastrous epidemics in 1873 and 1876, enacted a law "to prevent the introduction of contagious and infectious diseases into the United States," which was approved April 29, 1878. In this act it was provided "that there shall be no interference in any manner with any quarantine laws or regulations as they now exist or may hereafter be adopted under State laws"; but, nevertheless, the supervising surgeon-general of the Marine Hospital Service was to be "charged with the execution of the provisions of the act," and was to be authorized and required to "frame all needful rules and regulations for that purpose, which rules and regulations should be subject to the approval of the President, but should not conflict with or impair any sanitary or quarantine laws or regulations of any State or municipal authority which then existed or might thereafter be enacted."

Here, then, was again presented the very "difficulty" which Mr. Thurman had referred to in connection with the Bromberg bill, and which caused its defeat in the Senate. It was, doubtless, the recognition of this fact that prevented Congress from making any appropriations for the execution of the law, which thus became a dead letter.

The terrible epidemic of yellow fever in the immediately succeeding summer produced such an impression on the public mind as to the necessity of national sanitary legislation that the hopes of the advocates of a national quarantine were greatly revived. Several bills for establishing quarantine, with uniform regulations under national auspices and direction, were introduced in the winter of 1878-'79. One of these provided for the appointment of a director-general of health, who was to be charged with the duty of declaring quarantine, at his own discretion, in any part of the United States, and to make and enforce quarantine regulations (S. 1462, Forty-fifth Congress, third session, December 10, 1878).

This bill apparently met with no favor, and was never reported back from the committee to which it was referred; but a little later in the session Senator Harris, of Tennessee, chairman of the select committee "to investigate and report the best means of preventing the introduction and spread of epidemic diseases," reported a bill creating a bureau of public health charged with quarantine powers. The bureau was to consist of a director-general of health, who also should have charge of the Marine Hospital Service, and a board of health, to be composed of seven members from civil life, and of the surgeon-generals of the Army and Navy. The board was authorized and required to make rules and regulations for quarantine, and if the health officer of any port refused or failed to execute them, then the Secretary of the Treasury was authorized to appoint a health officer of the United States for such port who should enforce them. This bill passed the Senate, but was defeated in the House of Representatives at so late a period of the session that no other effort was made before the close of the Forty-fifth Congress for national legislation on the subject of quarantine.

At a very early day of the quickly-succeeding first session of the Forty-sixth Congress the patron of the defeated bill introduced another bill "to prevent the introduction of contagious or infectious diseases into the United States" (S. 108, March 24, 1879). It was provided by this bill that the National Board of Health, which had been created by the

act of March 3, 1879, should be charged with the "execution of all laws to prevent the introduction of contagious or infectious diseases into the United States, and the enforcement of all quarantine regulations established by law under the authority of the United States in respect to all vessels and vehicles engaged in commerce with foreign nations and among the States, whether by land or water."

This bill encountered a most earnest and determined opposition, chiefly on grounds of expediency, by senators who represented large commercial interests. It was urged that there are two great interests to be harmonized, and that while the prevention of the introduction of infectious diseases is one desideratum, another is that this should be done in accordance with all the rights and with all the facilities that can be appropriately conceded to the commerce of the country. It was assumed as undeniable that this latter condition would be rendered more secure if the regulation of quarantine was left to the States; and in illustration of the truth of this position, reference was made to a then recent order of the Treasury Department issued under the provisions of the quarantine act, approved April 29, 1878, by which it was declared "that until further orders, no vessel from any port of the Black Sea, or the Sea of Azof, conveying any rags, furs, skins, hairs, feathers, boxed or baled clothing or bedding, or any similar articles liable to convey infection, nor any vessel from any port in the Mediterranean or Red Sea having on board such articles coming from Southern Russia shall enter any port of the United States." It was contended that there was absolutely no occasion for such an order, which would surely prove to be a most serious embarrassment to our foreign commerce. A letter was read from Dr. S. O. Vanderpoel, the health officer of the port of New York, to show how unnecessary such an order was, and how much ignorance it betrayed of the channels of trade by which Russian rags could reach this country. It was stated in this connection that 948 paper mills in the United States imported into New York alone 121,348 bales of rags and paper stock, and the question was asked, "Shall this immense interest be jeopardized by the enforcement of an order based on wrong premises?" After a somewhat protracted and very able discussion, in which most of the speakers opposed the main features of the bill, it was finally recommitted by a decisive vote, in order that it might be so amended as to divest it of every feature which looked to the exercise of quarantine powers by the General Government—powers which, in the opinion of senators, might, and probably would, be used to the detriment of the great commercial interests of the country. It was accordingly so amended, and being reported back from the committee, finally passed both houses of Congress, and was approved June 2, 1879.

The incorporation in the bill of the amendments suggested during the debate in the Senate had served to secure its prompt passage by that body, but in the House of Representatives a somewhat irrelevant discussion took place May 27, owing to the fact that many of the members supposed that the bill, which had been taken from the Speaker's table, was the House bill No. 1604, containing all the objectionable features of the original Senate bill, whereas in point of fact the amended bill as it passed the Senate had, on motion of Mr. Young, of Tennessee, been substituted for the former. The bill thus substituted was read by the Clerk, but had not been printed for the use of the members, and several members opposed it without knowing the changes it had undergone by reason of the amendments in the Senate. But, independently of such opposition, one or more members took exception to the follow-

ing clause, which seemed to authorize the National Board of Health in certain contingencies to exercise a power overriding State authority:

And at such ports or places within the United States where quarantine regulations exist under the authority of the State, which, in the opinion of the National Board of Health, are not sufficient to prevent the introduction of such diseases into the United States or into one State from another, the National Board of Health shall report the facts to the President of the United States, who shall, if in his judgment it is necessary and proper, order said Board of Health to make such additional rules and regulations as are necessary to prevent the introduction of such diseases into the United States from foreign countries or into one State from another, which, when so made and approved by the President, shall be promulgated by the National Board of Health and enforced by the sanitary authorities of the States, where the State authorities will undertake to execute and enforce them; but if the State authorities shall fail or refuse to enforce said rules and regulations the President may detail an officer or appoint a proper person for that purpose.

See Appendix D for this and other acts defining the powers of the National Board of Health.

It was contended that this was an interference with State authority. But it was argued on the other hand that the discretionary authority thus proposed to be conferred on the President of the United States did not in anywise supersede State regulations. It merely proceeded upon the assumption, in strict accordance with the doctrine laid down by Chief Justice Marshall, that Congress may enact supplemental legislation and order its officers to aid State officers in carrying out State regulations; that Congress may enact provisions in aid of the provisions adopted by the State. The Hon. Mr. Goode, of Virginia, said:

We recognize and respect the quarantine systems of the States, where they exist; where none exist we establish regulations, and when those in existence are found to be insufficient for the purpose, the National Board of Health comes in to the aid of the State government, and becomes an outer guard, as it were, nearer to the line of the enemy's camp, in aid of the great object which the State has in view, the protection of the life and health of the people.

As the result of this thorough discussion, by which many minds co-operated in perfecting the bill, it was finally brought into full accord with the traditional policy of the nation, and was thereby made acceptable to many who had opposed it either on the ground of constitutional objections or of its tendency to derange the interests of commerce by substituting the control of the central Government for that of the State and local authorities.

In the course of the discussion in the Senate the advocates of the original bill were reproached for having framed it under the advice of a board composed of medical men who knew nothing of the important interests of commerce. The charge that the medical members of the board were better acquainted with the interests of the public health than with those of commerce was, of course, more or less well founded. So far as these members were consulted at all, it was with reference to the purely sanitary aspects of the question, and it was both natural and proper that they should indicate the measures which, in their judgment, would prove most effective for securing the ends of a thorough maritime sanitary police. It was for those who were charged with the responsible duty of making the laws to consider how far the proposed measures were consistent with the constitutional limitations of their authority and with the general interests of commerce.

It remained for the board of health to execute, to the best of its ability, the act of Congress after it became a law by the approval of the President. It was soon found that the system of co-operation with State and municipal boards of health, if not a theoretically perfect system, was yet practically efficient in a far higher degree than had been expected, and that it had some special advantages peculiar to itself.

The distinctive feature of this act, which went immediately into operation, is the entire abandonment of the proposition to clothe the National Board of Health with authority to make and enforce quarantine regulations for home ports, or with any independent power in regard to quarantine. It has generally been designated as a quarantine act simply because it relates to quarantine, but the use of such a designation has led to grave errors and to great confusion on the part of both friends and enemies of the National Board of Health, which was charged with the execution of its provisions. The key-note to the spirit and ultimate end of the general provisions of the act is found in the third section, which requires that the Board shall co-operate with, and, so far as it lawfully may, aid State and municipal boards of health in the execution and enforcement of the rules and regulations *made by such boards* to prevent the introduction of contagious or infectious diseases into the United States from foreign countries, and into one State from another. Accordingly, the National Board of Health never attempted to exercise any independent authority in matters of quarantine. It has consistently kept within the limits prescribed by the act under consideration, strictly confining its operations in this connection to the work of co-operating with and aiding State and local boards in the enforcement of *their* rules and regulations for preventing the introduction and spread of infectious diseases. It is true that in the exercise of its advisory functions, as prescribed by the act of March 3, 1879, it framed rules and regulations which it *recommended* for adoption by the local authorities. As nearly all of the health authorities in the several States of the United States adopted these recommended rules, the Board thereby secured a much closer approximation to uniformity than could otherwise have been obtained. Absolute uniformity was neither expected nor desired, for differences of climate and of proximity to, or of remoteness from, foreign foci of infection require certain modifications of rules in adaptation to varying local conditions. Herein is a precious advantage of this system of co-operation with State authorities over any possible system of a national quarantine. If the power to regulate quarantine be assumed by the General Government, it must be done under the constitutional power to regulate commerce, and the regulations must be absolutely uniform. This was fully recognized by Senator Harris, who, in the first draft of his bill (S. 108, March 24, 1879) inserted a clause requiring "that all rules and regulations framed by the National Board of Health under the authority of this act shall be uniform and subject to the approval of the President." Now, while it is exceedingly important that certain leading principles of quarantine should be uniform, the adoption of these, as recommended by the National Board of Health, did not prevent the local authorities from inserting such additional details, not inconsistent with these general principles, as may be of the highest value at one port, and unnecessary and burdensome at another. A national system of quarantine could make no distinctions without violating an express provision of the Constitution.

This act having imposed additional duties upon the Board, which had already entered upon another line of duty under the provisions of the constituting act of March 3, 1879, it became necessary to ascertain the precise force of the qualification implied by the terms "so far as it lawfully may," with respect to the kind and extent of the aid which was to be given to State and municipal boards of health. To this end, besides taking the advice of the legal member of the Board, who represented the Department of Justice, and that of the First Comptroller of the Treasury, to whom the officers of the Board were referred by the

Secretary of the Department when application was made to the latter in conformity with the requirements of section 8 of the act in question, they also consulted from day to day the chairmen of the Senate and House Committees on Epidemic Diseases, who had been so largely instrumental in securing its passage.

These officials were of one mind in maintaining that the main object of the act of June 2, 1879, was not so much to stamp out epidemics as to prevent their importation; that to secure this end the Board had full authority to expend the entire amount of the appropriation of \$500,000 in the first year, if this were found to be necessary; that no other aid than such as was necessary to prevent the importation of infection into the United States, or its spread from one State into another, would be lawful, and that accordingly it would be inadmissible for the National Board of Health to assume the charge of works of local sanitation, unless it could be shown that they were necessary to prevent the dissemination of infectious diseases beyond the limits of the State in which such operations were conducted.

It was also stated as a matter of fact that the bill as originally reported was without limitation as to duration, and that the amendment subsequently accepted by the patron of the bill, at the suggestion of Senator Morgan, of Alabama, was avowedly for the purpose of testing the efficiency of the proposed measures, and had no reference whatever to such a use of the funds appropriated as to distribute them over the entire period of four years without further aid from Congress.

When this matter was under consideration in the Senate on the 22d May, 1879 (see Congressional Record), Senator Eaton inquired why there was a necessity for so large an amount as \$500,000? The Senator from Tennessee, who had reported the bill, referred to the third section, which required the Board to co-operate with, and, so far as it lawfully may, to aid State and municipal boards of health in the execution and enforcement of the rules and regulations made by such boards to prevent the importation of contagious and infectious diseases into the United States, and into one State from another, and then proceeded to say:

In the event of such an epidemic as we had last year I can assure my honorable friend that \$500,000 would be a very small estimate for the various duties that will devolve upon the Board of Health in the execution and enforcement of the rules and regulations and the construction of such buildings and such other appliances as will be found absolutely necessary to prevent the spread of disease from one State to another.

In the course of subsequent remarks of the same day Senator Harris said:

- Whatever expenditure may be necessary to aid that purpose (*i. e.*, to prevent importation of contagious or infectious diseases into the United States), will be a legitimate expenditure for the Board to make, and in addition to the aid it may give to those local associations or boards it may find it necessary, as I endeavored to explain a moment since, to construct in the interior, for the purpose of preventing the spread of disease from one State into another, quarantine buildings. It is difficult to estimate to what extent; it is difficult to determine what they are to cost, but in the opinion of the Board of Health, and in my opinion, and in the opinion of the committee, \$500,000 is the very least amount that ought to be appropriated and be subjected to their uses in the event an epidemic should prevail and the necessity shall arise for the construction of buildings in the interior or on the seaboard where buildings do not exist and are necessary to the enforcement of the rules and regulations that are prescribed by this bill.

Furthermore, a motion of Senator Eaton to reduce the appropriation to \$250,000 was lost by a vote of 19 to 33.

Not a single speaker at any stage of the debate intimated that the amount in question was intended to cover a term of four years, and in

voting that amount, after the statement of Senator Harris had been made, Congress may justly be considered as giving its sanction to the views announced by that Senator.

Being thus fortified by the opinions and advice of legal experts as to the scope of its duties and the extent of its powers, under the provisions of the act of June 2, 1879, the Board promptly prepared a body of rules and regulations relative to quarantine. They were aided in the performance of this task by the quarantine authorities of the principal ports of entry of the United States, a general invitation having been extended to all sanitarians who felt an interest in the subject. From the very start it was careful to disclaim any authority to enforce the regulations relating to quarantine at our home ports, but in the exercise of its advisory functions, under the constituting act of March 3, 1879, it *recommended* them to be adopted at the various ports of the United States, and in point of fact they were soon adopted by the health authorities of all, or nearly all, of these ports. At or near the same time various rules and regulations were prepared and published, which were either expressly required by the law of June 2, 1879, or were in close consonance with its requirements. These, too, were *recommended* to be adopted by the sanitary guardians of places in which yellow fever existed or was threatened.

After ordering a sanitary survey of the several maritime ports of the United States from Portland, Me., to the mouth of the Rio Grande, and an inquiry into their existing quarantine laws and regulations, with a view to ascertain what kind and extent of aid would be necessary to give efficiency to their quarantine machinery and thus to secure a more perfect protection against the introduction of infectious diseases of exotic origin, the Board found itself suddenly confronted by an alarming epidemic of yellow fever in Memphis, a formidable outbreak in New Orleans, and its almost simultaneous appearance in several other localities.

To suppress these outbreaks as promptly as possible, and meanwhile to limit the area of their extension by all the means which the experience of sanitarians had shown to be available, engaged the earnest and assiduous attention of the Board of Health during the remainder of the summer. As to the accomplished results it is permissible to cite a passage from a report made to the Senate of the United States at the first session of the Forty-seventh Congress, from the select committee "to investigate and report the best means of preventing the introduction and spread of epidemic diseases." This report was prepared by the distinguished Senator at the head of the committee, who, being a resident of Memphis, the seat of the principal epidemic, knew well whereof he spoke:

The epidemic of 1879 at Memphis and New Orleans made its appearance before the National Board had been able to perfect its plans of prevention; though it is, in the opinion of the committee, doubtful whether that epidemic could have been prevented, as it is not certain whether it originated from germs of the epidemic of 1878 which had survived, or in fresh importation of the disease. But, under the rules and regulations adopted by the Board to deal with it, it was actually stamped out in New Orleans and confined to the limits of Memphis; and, instead of the general demoralization and panic, with suspension of business, trade, and commerce which pervaded the country in 1878, commerce and communication with the infected cities were *regulated*, *not stopped*, or even retarded to any considerable extent, and the general business of the country went on in its usual methods and through its usual channels without serious interruption. Instead of panic and alarm, confidence and a sense of security pervaded the country. The great transportation companies of the South, both river and rail, are unanimous in their approval of the action and methods of the National Board in dealing with such cases, because experience has shown that they give the necessary security against the spread of disease without stopping or retarding to any

considerable extent commercial intercourse. They have learned from their own experience that the certificate of the National Board of Health as to the sanitary condition of any city or place is accepted by other cities and States as testimony coming from a strictly impartial and well-informed authority, independent of all local interests and influences, commercial or otherwise. In the opinion of the committee it has accomplished much, and is capable of accomplishing highly important results of great benefit to the country, results which can be accomplished by no other agency.

Prior to the appearance of these outbreaks the Board of Health had anticipated the necessity of devising measures of prevention, in conformity with the express object of the law, but in addition to the difficulty arising from the shortness of the interval another and quite unexpected source of embarrassment was disclosed. It has already been stated that in the discussion in the Senate Senator Harris had twice referred to the construction of such buildings and such other appliances as would be found absolutely necessary to prevent the introduction of disease and its spread from one State to another. No one dissented from this view, except on the ground of expense, and on a test motion to reduce the appropriation to half the amount reported by the committee the proposed reduction was voted down by a very large majority.

The grounds on which quarantine buildings and other less costly appliances were considered to be absolutely essential to the success of any systematic plan to prevent the introduction of infectious diseases into the United States have been succinctly stated in former annual reports of this Board, especially that for 1882. It is there shown that an effective quarantine requires the following elements of equipments:

(1) A steam boarding vessel and boats with officers and crew, to be ready at all times to convey the quarantine inspecting officer to the quarantine anchorage, where suspected vessels are detained until released by order of the said officer; (2) a hospital in which persons sick with infectious diseases may be isolated and treated by a competent physician; (3) a lazaretto for the accommodation of persons not sick but detained under observation as having been taken from an infected vessel; (4) officers' quarters; (5) a warehouse of sufficient dimensions to store the cargoes of infected vessels when it becomes necessary to discharge the cargo in order to its disinfection, and to the cleansing and disinfection of the hold of the vessel; (6) a wharf or wharves at which the discharge of the cargo takes place; (7) boats, &c., or for administration.

The law made it the duty of the Board to aid State and municipal boards of health in their efforts to prevent the introduction of infection through any avenue by which it was likely to find entrance into the country. It was just as easy to find admission through the smaller and unimportant ports, and thence to spread through the country, as through the ports of larger trade, protected, as the latter are, by a more perfect quarantine machinery, kept in constant operation by means of abundant quarantine fees. Numerous examples might be cited besides that of Indianola, in 1867, and there are several dozens of such ports whose insignificant trade does not warrant the expectation that the local authorities will go to the expense of providing the necessary safeguard against the introduction of yellow fever, and yet the character of that trade carried on in foul vessels exposes them, in a special degree, to the risk of receiving the infection. What was the National Board of Health to do to meet the requirements of such cases? Was it to wait until the infection had been introduced and then only interfere by establishing a cordon around the infected territory? The act of June 2, 1879, may be scrutinized in vain to find a warrant for such a course of official action. The object of the law was, in the first instance, to prevent the introduction of infection into the United States, which is far more easily accomplished by appropriate means than it is to circumscribe it within narrow limits after its introduction. At all events, such was the expressed object of the law, and the duties of the Board were so defined as to be clearly in conformity with this object. But it was manifestly out of the question to attempt to establish a thoroughly equipped quarantine station at each of the numerous exposed ports not protected by State or municipal regulations adequately enforced. An attempt to do this would have required more than ten times the full amount placed at the disposal of the Board. In this dilemma the Board profited by the experience of other nations having a longer and larger experience in matters of quarantine. Thus, in France and Portugal vessels subject to quarantine, which arrive at ports where quarantine cannot be under-

gone, must proceed immediately to quarantine stations; as, for example, vessels liable to quarantine at Dieppe and other northern ports of France are sent to the quarantine station at Havre, and medical assistance is provided at the public cost. (Sir Sherston Baker: Laws relating to quarantine, 1879.)

But the English law was yet more suggestive and significant. By virtue of an act of Parliament, orders in council provide that all vessels not having infectious disease actually on board, but not furnished with clean bills of health, arriving in the United Kingdom, and coming from the Mediterranean or from West Barbary on the Atlantic Ocean, shall perform quarantine in Standgate Creek or Milford Haven, and nowhere else. Then, for actually infected vessels it is provided in the same orders in council as follows:

"28. And for the better guarding against the introduction of the plague into the United Kingdom, it is hereby ordered that, in the event of the plague actually appearing on board any vessel on her voyage to any port in the United Kingdom, she shall immediately, if to the south of Cape St. Vincent, repair to some lazaretto in the Mediterranean, there to perform quarantine, and if to the northward of Cape St. Vincent, she shall immediately repair to Milford Haven, there to perform quarantine." (*Ibid.*, p. 91.)

Here, then, was pointed out a practicable method of executing the duties prescribed in the law of June 2, 1879, to the end of preventing the introduction of infectious disease into the United States at a comparatively trifling expense. It was only necessary to provide three or four refuge stations where good anchorage could be had at such a distance from the channels used by vessels engaged in trade as to insure perfect isolation, and thus avoid the risk of infecting other vessels. To such stations the local health authorities charged with the duty of exercising the police power of the States were to be invited to send all infected vessels liable to quarantine at their respective ports. It was ascertained that such a station could be established for about \$30,000. It was proposed that each should be operated in aid of numerous ports distributed over an extensive line of coast and belonging to different States.

On consultation with its legal advisers it was ascertained that the act of June 2, 1879, did not confer authority on the Board to erect buildings or to acquire, on behalf of the United States, titles to real estate. When this fact was made known to the committees of the Senate and House of Representatives, which had been instrumental in procuring the enactment of the law in question, a supplemental bill was introduced, and having passed both houses was approved July 1, 1879. By the sixth section of this act it is provided that—

"Section 3 of the act approved June 2, 1879, entitled 'An act to prevent the introduction of contagious or infectious diseases within the United States,' be amended as follows: At the end thereof insert: And the Board of Health shall have power, when they may deem it necessary, with the consent and approval of the Secretary of the Treasury, as a means of preventing the importation of contagious or infectious diseases into the United States, or into one State from another, *to erect temporary quarantine buildings, and to acquire, on behalf of the United States, titles to real estate for that purpose, or to rent houses, if there be any suitable, at such points and places as are named in such section.*"

In strict conformity with the provisions of this act, having the consent and approval of the Secretary of the Treasury, the Board proceeded to erect on Ship Island, with the consent of the Secretary of War, whose Department held possession of the island, temporary quarantine buildings—temporary in the sense of being constructed of plank at small cost, and yet commodious and capable of being kept in repair by a small annual outlay. The entire cost of four such buildings and a wharf of considerable length did not exceed \$20,000.

The Board felt entirely secure as to the probable concurrence of Congress in the establishment of these harbors of refuge for infected vessels, not only because that body had conferred ample powers on the Board with respect to the aid to be given to State and municipal boards of health, but also because it had distinctly announced in its first annual report for 1879, before any practical action had been taken in this direction, its purpose to enter upon this line of policy in accordance with the advice of the National Academy of Sciences, and no unfavorable comment had been made by either of the committees (House or Senate) to which that report had been referred. It was, therefore, with great surprise that at a later period of the session, when the House Committee on Appropriations made their report, the Board found a prohibitory clause, which, by imposing a maximum limitation to the amounts of its

disbursements, prevented the establishment and full equipment of other refuge stations similar to that at Ship Island, although adequate funds were on hand and standing to its credit on the books of the Treasury.

With regard to these places of refuge for infected vessels it should be observed that the Board of Health has never claimed authority to compel such vessels to repair to them, there to perform quarantine before attempting to enter their ports of destination. The name National Quarantine Stations, which has been applied to them, has given rise to the belief on the part of some persons that quarantine powers were exercised by the National Board of Health, when in fact the law confers no such powers on the Board, but only requires it to aid State and municipal boards of health in the execution of *their* quarantine regulations. It is only these latter authorities who can lawfully use compulsory means in the exercise of their police powers. They require infected vessels to report to these stations for disinfection and other appropriate treatment in isolated localities remote from the channels of commerce, and thus removed from the danger of communicating infection to other shipping, as not seldom happens when a number of vessels are detained at quarantine stations having but a limited extent of anchorage.

In former reports of this Board it was stated that the great value of these refuge stations had been fully recognized by the health authorities of every port of entry on the South Atlantic and Gulf coast, save only those of New Orleans, who had persistently rejected the proposition to direct the masters of infected vessels to repair to Ship Island and undergo disinfection before attempting to enter the Mississippi River. Nay, the recommendation of such a policy by the National Board of Health was not only rejected by the health board of Louisiana, but was angrily resented and characterized as preposterous. It is gratifying now to find that during the past summer (1883) the governor of Louisiana issued an order that no infected vessel should be allowed to enter the Mississippi River, thus tacitly acknowledging the wisdom of the advice which had been given by this Board as early as the spring of 1880, and had been thereafter renewed with earnestness on every suitable occasion.

CONSULAR REPORTS.

A review of the operations of the Board under the quarantine act of June 2, 1879, cannot be closed without a recognition of the earnest and able co-operation of our consular officers. Notwithstanding the failure of the act, through the proviso requiring its promulgation in a foreign state, these officers labored faithfully, and often under difficulties, to carry out the intent of the law by effecting the inspection of vessels bound to our ports from foreign centers of infection. They kept themselves well informed as to the sanitary condition of their respective districts, reporting weekly to the Board, and specially, when the importance of the circumstances appeared to require such action. Their intelligent support during the past four years contributed materially to the success of the work, and it is here gratefully and earnestly acknowledged. Attention is invited to Appendix E, wherein will be found reports and papers on cholera, typhoid fever, leprosy, beri-beri, the disposal of sewage, &c., written or transmitted by the members of the consular corps, together with a report on cholera in Japan, by Dr. D. B. Simmons, chairman of the Yokohama Foreign Board of Health.

SANITARY INSPECTIONS BY THE NATIONAL BOARD OF HEALTH IN CONNECTION WITH INTER-STATE QUARANTINE ESTABLISHED BY STATE AUTHORITY.

The marked success which was the outcome of the policy of absolute non-intercourse with infected localities practiced in 1878 in some of the towns in the Mississippi Valley, and enforced by what is known as the "shot-gun quarantine," furnished an adequate inducement to the civil authorities of other towns to follow this example whenever a similar exigency should arise. Accordingly when, in July, 1879, cases of yellow fever appeared in Memphis, and in New Orleans and some other localities in Louisiana, there was a prompt manifestation on the part of health authorities of the various municipalities of the valley to enforce the most rigorous system of non-intercourse with these several foci of infection. In the case of Memphis, where the outbreak soon assumed the proportions of a most serious epidemic, this action on the part of its neighbors scarcely produced remonstrance. It was received with at least passive acquiescence by the authorities of the infected city. It seems almost certain that in this case the germs of the disease had survived the epidemic of the preceding year, having been kept during the intervening winter in a few closed houses in which carpets and other woolen fabrics had remained *in situ*. Before these facts were known, and indeed before any cases of fever had appeared, efforts had been made by the National Board of Health to prevent the transmission of infection northwise from New Orleans, if it should appear in that city, and to suppress threatened outbreaks, of whatever origin, by measures of local sanitation and by the organization of medical relief corps at exposed places. When the disease did appear in New Orleans isolation and disinfection of infected houses and other preventive measures, promptly and energetically applied by the advice and largely at the expense of the National Board of Health, proved successful in restraining the spread of infection beyond circumscribed limits, and rendered unnecessary such a general embargo on the commerce of the city as was imposed on that of Memphis.

As early as April 3, 1879, before the enactment of the law of June 2 of that year, and when the Board of Health had only such advisory powers as are specified in section 2 of act approved March 3, 1879, namely, to obtain information upon all matters affecting the public health and to advise certain officials, including the executives of the several States, on all questions submitted by them, "*or whenever, in the opinion of the Board, such advice may tend to the preservation and improvement of the public health.*" the Board selected one of its members, Dr. R. W. Mitchell, of Memphis, on account of his large experience in connection with several previous epidemics, "to prepare a plan of organization for relief in the case of an epidemic of yellow fever in an inland town or city, to include the organization of medical relief and nurses."

It was stated above, that after the passage and approval of the act of June 2, 1879, the Board proceeded without delay to frame the rules and regulations prescribed in that act. In this work it was aided by the quarantine officers of New York, Baltimore, and New Orleans. It also prepared other rules not specially contemplated by the act in question, but believed then, and subsequently ascertained to be, of great value in connection with the efforts to prevent the spread of infectious diseases. These latter rules, relating to quarantine at the home ports and to inter-State quarantine, the Board had no authority to enforce, but they were published in a circular issued to State and municipal health

authorities, with the *recommendation* that they should be adopted and enforced by them. These two classes of rules included the following:

1. Rules and regulations for securing the best sanitary conditions of vessels, including their cargoes, passengers and crews, coming to the United States from any foreign port where any contagious or infectious disease exists. These rules and regulations, when approved by the President, have the force of law, and were to be communicated to and enforced by the consular officers of the United States, subject to certain conditions.

2. Rules and regulations *recommended* to be adopted and observed for securing the best sanitary condition of steamboats and other vessels, including their cargoes, passengers, and crews, going from any port in the United States where yellow fever exists to any other port or ports in the United States.

3. Rules and regulations *recommended* to be observed at the port or place of departure when yellow fever exists there or in the vicinity.

4. Rules and regulations *recommended* to be adopted and observed for securing the best sanitary condition of railroads, including station houses, road beds, cars of all descriptions, freights, passengers, and employes, coming from any point where yellow fever exists; and also those to be observed and enforced at any place where yellow fever exists having railroad connections with other places.

5. Rules and regulations *recommended* to be adopted and observed when yellow fever is reported or suspected to exist in any town or place in the United States.

6. Circular to State and municipal health authorities transmitting the foregoing rules and regulations, which the Board *recommended* to be adopted in order to secure efficient co-operation, by means of measures as nearly uniform as possible, in the important work of preventing the introduction of contagious and infectious diseases into the United States and into one State from another.

These several papers were transmitted to Congress in connection with the First Annual Report of the Board, and have been printed in Appendices M and N of that report. Some of them, notably the first in the above series, have recently been modified to some extent, in order to adapt them to the special treatment of the actual or threatened introduction of small-pox into the United States, and the railroad transportation of immigrants landing on our shores from countries in which that disease exists.

The rules thus recommended to the health authorities of the several States were promptly adopted by the State boards of health of Louisiana, Mississippi, and Tennessee, the principal sufferers by the devastating epidemic of 1878. Other States, less concerned as to a probable invasion of yellow fever, followed their example in quick succession. Just before these rules had been prepared, and had indicated to local health authorities the measures whereby the interests of commerce might be consulted without detriment to the public health, other and very different measures, looking exclusively to the latter interest, were in course of preparation by the health officers of certain States. These, though strictly in accordance with the statute laws of the State, and coming within the constitutional powers of the State, would have been as destructive of all commerce with suspected towns as had been the extra-legal and barbarous policy of the shot-gun quarantine.

The following correspondence between the executive officer of the Mississippi State board of health and the attorney-general of that State will serve to show the severity of the restrictive measures contemplated by that board, measures which in all human probability would have been enforced in necessary self-defense had not the National Board of Health interposed with counsel and pledges of prospective aid in carrying out the *recommended* rules and regulations:

OFFICE MISSISSIPPI STATE BOARD OF HEALTH,
Jackson, Miss., June 12, 1879.

DEAR SIR: I respectfully request your opinion as to whether the boards of supervisors of counties or the governments of incorporated towns have the power to prevent the passage or running of railroad trains within their jurisdiction in order to

prevent the introduction or spread of yellow fever or other contagious or infectious diseases. Your opinion on this question is sought with special reference to quarantines that may be established to prevent the introduction and spread of yellow fever. The question in this connection is one of great interest, for if such power is possessed, one important factor (railroad trains) in introducing epidemics into our State from neighboring States might be removed.

Please also inform me if the same authorities have the power to prevent the running or passage of water-craft.

Very truly, yours,

WIRT JOHNSTON,

Secretary and Executive Officer, Mississippi State Board of Health.

Hon. T. C. CATCHINGS,
Attorney-General.

VICKSBURG, June 14, 1879.

DEAR SIR: Yours of the 12th instant received. Under section 2739 of the Code it would be extremely difficult to place a limit upon the power of the boards of supervisors and the corporate authorities of cities and towns in adopting measures to prevent the introduction or spread of yellow fever and other diseases. The language of that section is extremely broad, and would, I think, warrant the stopping of trains and the landing of vessels, if deemed necessary or expedient to prevent the introduction or spread of diseases.

The power conferred by this statute is, in my judgment, broad enough to cover any measure deemed expedient and proper.

Quarantine regulations and health laws of every description being regulations of police, are clearly within the sovereign power of the States, do not violate any constitutional provision, are sustainable even if they affect commerce incidentally, and have generally passed unchallenged. I have no doubt of the validity of the statute mentioned, whether viewed from a constitutional standpoint or otherwise.

Possessing the power itself, the State can execute it either directly or through the agency of counties and towns.

Respectfully,

T. C. CATCHINGS.

Dr. WIRT JOHNSTON,
Jackson, Miss.

As already stated, Mississippi promptly adopted the system recommended by the National Board of Health, and agreed to accept the certificates of freedom from infection to be given by sanitary inspectors of of this Board; thus waiving its right to declare absolute non-intercourse with places against which there might be a reasonable suspicion of infection.

In framing the rules and regulations recommended for adoption by the State authorities the National Board of Health was very largely indebted to the suggestions of these very authorities. Very soon after the establishment of the Board, and before the enactment of the law of June 2, 1879, which conferred additional powers and imposed new duties, the health authorities of the Mississippi Valley States assembled in Memphis, April 30, 1879, and by their own voluntary action established a health organization, thereafter known as the "Sanitary Council of the Mississippi Valley." It embraced in its membership accredited representatives of State boards of health and other official bodies interested in the general objects of the association from every State in the valley of the Mississippi, from Minnesota to Louisiana, inclusive. The main object was conclusively stated by General Cyrus Bussey, of New Orleans, on taking the chair to which he had been called pending the permanent organization of the council. He briefly recited the action taken in his own city, and then said:

He was in attendance on behalf of the *mercantile fraternity* of New Orleans to confer with the medical fraternity, in order that they might together concert some action by which future epidemics might be averted or controlled. He assured the convention that the Auxiliary Sanitary Association of New Orleans, which he had the honor in part to represent, was in full accord with the authorities of that city in instituting such

sanitary measures as might be calculated to further the end in view, and to allay the fears of the people of the Mississippi Valley as to the breaking out of another epidemic in New Orleans.

The council adopted, among other resolutions of a preliminary character, the two following:

Resolved, That the council heartily indorses the bill now pending before Congress "to increase the efficiency of the National Board of Health, and to prevent the introduction into, or spread within, the United States of contagious and infectious diseases," and would respectfully recommend its speedy passage by Congress, so as to clothe the Board with executive as well as advisory powers.

Resolved, That this council is in hearty sympathy with the National Board of Health in its object of securing the restraint of pestilential epidemics in the whole country, and pledges itself to a hearty co-operation with the National Board of Health in this noble work.

The principal work of the council was done at an adjourned meeting held in Atlanta a few days later, where a conference on the subject of quarantine, both maritime and inland, had been called by the National Board of Health, in accordance with the requirements of section 3 of the constituting act approved March 3, 1879. After thoughtful deliberation and discussion the council adopted the following propositions relating to the measures to be adopted to prevent the recurrence of the spread of infection from the seaports into the interior by river craft and by railroads:

SANITARY INSPECTION OF STEAMBOATS CARRYING PASSENGERS AND FREIGHT FROM THE GULF PORTS INTO THE INTERIOR.

Proposition 1.—Every captain or commanding officer shall keep in a book of permanent record the sanitary history of the steamboat from the 1st of April to the 1st of December, inclusive. Such captain or commanding officer, before leaving a seaport city or town, shall obtain a certificate from a medical inspector, which certificate shall be entered upon and form a part of said record, certifying that he has personally examined the steamboat, and that all the rules and regulations adopted by this council relating to the cleansing and disinfection while at the docks and wharves of a city or town, have been complied with. Said certificate shall also state that the cargo of freight, of whatever description, is in good sanitary condition, and may be safely transported to its point of destination.

Proposition 2.—The captain or commanding officer shall daily enter upon this record all facts relating to the health of the passengers and crew, and the amount and kind of sanitary cleansing during the passage.

The following amendment to this proposition was offered:

That the captain or commanding officer be compelled to verify by affidavit at the time of inspection the correctness of the daily record.

The motion to amend was carried, and the proposition as amended was adopted.

Proposition 3.—The reinspection of said boat shall be required only at the point of destination (except as hereinafter provided), at which point the medical inspector shall examine, before she discharges her cargo, the sanitary record of the boat and the boat itself. If such record has been neglected, and the boat is in a bad sanitary condition, the medical inspector shall require proper sanitary cleansing before the cargo is discharged or a new cargo is put on board. On the return passage the same rules apply.

Proposition 4.—All boats navigating the Mississippi River shall undergo inspection and reinspection, in the same manner as above provided, upon arrival at New Orleans, Vicksburg, Memphis, Cairo, and the point of destination.

Proposition 5.—Whenever yellow fever or cholera prevails at any of the Gulf ports the medical inspector shall certify on the record the precautions that have been taken, and the danger to be apprehended from cargo, passengers, and crew. The reinspection must be made at least 1 mile from a town, at a point suitable for the care of the sick, detention of the well, and the disinfection and cleansing of cargo and boat.

Proposition 6.—The foregoing rules and regulations shall also apply to tugs, tows, and barges.

Appropriate action was also taken by means of similar propositions, *mutatis mutandis*, with reference to the *sanitary supervision of railroads, and of travel and traffic by railroads*, enjoining perfect cleanliness and

ventilation, with frequent disinfection, and the establishment of transfer stations at points not less than 5 nor more than 75 miles from infected points of departure. At these stations there should be an entire transfer of passengers and baggage to another train of cars, which train should never enter an infected district. It was required that this transfer should be made under the supervision of a medical officer, and that no person with fever should be allowed to proceed on this train, but be required to return to the point of departure or be treated in a hospital at the place of transfer. Through freight cars were to be allowed to pass without transfer, provided they were ventilated in such a way that a constant current of air passed through them during transit. Way freight was to be transferred at a point not exceeding 50 miles from the point of departure, and the cars from which such freight had been transferred were not to proceed further on the road, but to be returned to the point of departure, and during the existence of an epidemic of yellow fever, the cars, after unloading, were required to be thoroughly cleansed by scrubbing and sprinkling with carbolic acid, or fumigated and disinfected, and then painted.

Then, by a formal resolution, it was ordered :

That the secretary be, and hereby is, instructed to communicate to the National Board of Health, and to all local boards of health in the Mississippi Valley, a copy of the regulations adopted by this association, with the request that the same be enforced so far as practicable and as existing laws will permit, to the end that uniformity of action may be secured.

We cannot but admire the spirit of moderation which characterizes the conception of this system of sanitary supervision with a view to the prevention of epidemics. Fresh from the recollection of the frightful consequences of permitting water craft and railroad carriages in an unsanitary condition to pass along their accustomed channels, sowing the seeds of disease and death wherever they stopped even for the shortest time, these experienced sanitarians recognized it to be their duty to recommend such a system of inter-State sanitary police as would suffice to protect the public health with the least possible interference with the interests of commerce and with personal freedom. It stands in marked and beneficent contrast with the shot-gun quarantine, whether as practiced lawlessly by individuals or communities or as legalized under the form of sanitary cordons.

After the passage of the act approved June 2, 1879, which, as has been seen, required the National Board of Health to co-operate with and aid State and municipal boards of health in the execution and enforcement of the rules and regulations made by such boards to prevent the introduction of contagious or infectious diseases into the United States from foreign countries and *into one State from another*, this Board became satisfied that the ends of the law would be most surely attained at a minimum of expense by carrying out the above-cited propositions of the sanitary council of the Mississippi Valley. This was the precise kind of co-operation and aid which the local health authorities requested, and which the Board was required to extend in conformity with the provisions of the law. The Board accordingly proceeded without delay to organize a system of sanitary inspections of steamboats and other river craft to be conducted at various points on the Mississippi River. This system of inspections has since been designated as the Mississippi River inspection service. The points selected were New Orleans, Bayou Sara, and in the vicinity of Vicksburg, Memphis, and Cairo.

It should be remarked that the Board claimed no independent au-

thority to compel the masters of vessels to comply with the regulations for inspection and disinfection. All police power remained with State and local health authorities, and these gave public notice that no vessel coming from below should be allowed to come to shore or to land freight or passengers within their respective jurisdictions unless it exhibited a certificate from a duly commissioned inspector of the National Board of Health setting forth the fact that the vessel was found to be free from suspicion of infection.

As stated in former reports :

The Board confidently affirms that the advantages which have been realized by this instrumentality in preventing the spread of disease, in restoring confidence all along the river, and in thus preventing the imposition by State and municipal authorities of needless and burdensome restrictions on commerce, have been so past as to warrant the assertion that they would have been cheaply purchased at the cost of all the money placed at the control of the Board, though nothing else had been gained.

This assertion was held to be justified by the facts and testimony cited in the reports of Dr. R. W. Mitchell, a member of this Board, who had been assigned to special duty as director of the service. Reference is now again made to the strong and very emphatic testimony recorded in that report (see Annual Report of National Board of Health, 1880, Appendix S, p. 617), from the Memphis Cotton Exchange, and kindred bodies in Little Rock, Shreveport, Vicksburg, and elsewhere ; from the general superintendent of the Mississippi and Tennessee Railroad and to officers of other leading railroad lines ; from the superintendent of the Saint Louis and Vicksburg Anchor Line of Packets, and representatives of various other similar lines of railroad and packet companies.

It is there also stated that "the largest item of expense incurred in connection with this service was the cost of a sanitary-patrol boat, the H. H. Benner, used to enable the director of the service to visit inspecting stations, to board steamers in transit, and in case of epidemics to convey assistance to isolated communities. Had the Board possessed such a patrol boat in the summer of 1879 there can scarcely be a doubt but that it would have been possible to stamp out the disease in several places before it had caused a tithe of the mortality and interruption to business which ensued in those localities."

It was with such evidences of the beneficent results of this service that the Committee of the Senate on Epidemic Diseases came to the conclusions stated in a report made to that body April 18, 1882 (to accompany bill S. 1049), from which an extract has been cited above (p. 27). A later but very similar report from the same committee, to accompany bill (S. 2259), January 26, 1883, is appended, and marked F. It was hazardous little to affirm that such results could not have been accomplished by any other agency. The individual States were powerless in respect to any operation which was required beyond their respective territorial limits. The same difficulty was encountered in respect to combined action, for it was legally decided in Mississippi that the State board of health could not lawfully employ its funds in payment of services rendered outside of the State, and yet it was apparent that the interests of public health in that State would be greatly promoted by a sanitary inspection at the point of departure of railroads and river craft in another State, where the inspection could be made in such a manner as to avoid the extreme inconvenience to passengers and the vexatious obstructions to commerce incident to the enforcement of quarantine measures at the State line. No objections were made to the proposed inspections by the owners and masters of river craft or by the superintendents of railroads. Their consent was indeed an express condition

of the establishment of the inspections, and so anxious were the railroad authorities to have the guarantee of unimpeded commerce which the certificates of the inspectors secured, that they agreed themselves to pay the salaries of the inspectors if the National Board of Health would appoint and duly commission them.

For the first two years applications for the establishment of this service came from all the State boards of health in the Mississippi Valley, not excepting even the Louisiana board, whose jurisdiction included the municipality of New Orleans, where the principal inspections were to be made. In replying to a request from the president of that board for the establishment of these inspections on both river craft and railroads, an official communication from the National Board of Health, dated June 15, 1880, had the following statement:

Dr. J. L. Cabell to Dr. Joseph Jones, June 15, 1880.

[Extract.]

This Board claims no authority whatever to require the owners of boats to submit to such inspection, but in the interest of inter-State commerce it agrees to make these inspections and to furnish certificates in the case of steamboats, &c., *upon request of the owner, agent, or captain of such boats*, in the hope and belief that the certificates will prevent unnecessary interference above, and thus operate to the great advantage of New Orleans and the towns above. If the authorities of New Orleans choose to make it obligatory on the masters of boats clearing from that port to undergo these inspections the National Board could have no objection, but it disclaims any authority to make such order itself. The rules in question, being recommended for the protection of places above New Orleans, will doubtless be enforced by the local authorities of such places. The special object for which they were submitted to the State board of Louisiana was to invite suggestions and criticisms before they were finally adopted by this Board itself, and I may remark that since they were thus submitted they have undergone some modifications. As adopted they will be printed in No. 50 of the Bulletin, a copy of which will be sent to you as soon as it comes out.

* * * * *

The executive committee directs me to say that while it has approved the appointment by Dr. Bemiss of three medical inspectors of railroads *nominated* by you, it does not clearly see that it was necessary or desirable to inaugurate railroad inspections in the absence of yellow fever; and inasmuch as a recent act of Congress in largely reducing the appropriation asked for by this Board, and restricting the use of a large part of the appropriation that was granted to the contingency of an epidemic, it will probably not be possible to continue this service beyond the present month (June) unless in the mean time cases of yellow fever should have occurred, in which contingency a portion of the appropriation not now available will become subject to the uses of the Board in extending aid to local and State boards of health.

To this the following reply was made:

Dr. Joseph Jones to Dr. J. L. Cabell, June 25, 1880.

[Extract.]

The Board of Health authorized the president to express the conviction that the inspection of railroads is equally important with the river inspection service, and that both *are essential* to give confidence to the surrounding States and towns. The river inspection would be comparatively valueless without the railroad inspection, of which fact the faithful and efficient corps of inspectors have given many proofs. Dr. Rice, of the National Board (inspector), is in full accord with the State board on this subject. Up to the present moment the parties interested in the railroads and steamboats have yielded cheerful acquiescence to all the rules and regulations of the inspection service.

Thus it appears that as late as the last week of June the action of this Board, in connection with the Mississippi River inspection service, met the concurrence of all the interested parties. But shortly thereafter an incident occurred which caused an unnecessary alarm in places where the remembrance of disasters due to the spread of yellow fever from New

Orleans was still fresh. It also led to the adoption of measures to which the health authorities of New Orleans took violent exception, and for which they most gratuitously held the National Board of Health to be responsible. This incident was the arrival of the bark *Excelsior* at New Orleans, after a detention of twelve days at the quarantine station of that city, and the occurrence of a fatal case of yellow fever among the crew during the discharge of cargo. As soon as it was clearly ascertained that the case in question was really one of yellow fever the vessel was ordered back to quarantine, where four other cases occurred on board, of which two were fatal. It appears from statements officially made by the president of the board of health of Louisiana to the governor of the State that the *Excelsior* left Rio de Janeiro on the 10th of May, and arrived at the Mississippi quarantine station June 24, a voyage of about fifty-six days; that no case of sickness occurred at Rio, where she had remained nearly a month, nor during the voyage, and while at the Mississippi quarantine station her cargo, consisting of 3,600 sacks of coffee, was shifted, aired, and subjected to repeated disinfections. The bark arrived at New Orleans on the 5th of July and commenced discharging cargo. On the evening of the 7th one of the men complained of being sick, and had medical attention. On the morning of the 10th he was transferred to the Touro Infirmary, where he was seen by Dr. Loeber, a member of the Board of Health, who recognized yellow fever and officially reported it as such. On the same day the president of the Board officially informed the resident member of the National Board of Health of the case, and of his having ordered the vessel back to the quarantine station, with all other necessary precautions, adding that he would furnish any further information desired.

These facts were recited at a meeting of the Louisiana State board held on the 12th of July, and the publication of the same in the New Orleans newspapers led to very prompt action on the part of the health authorities of the States of Tennessee and Mississippi, and eventually to a disturbance of the amicable relations previously existing between the health authorities of New Orleans and the National Board of Health, which was gratuitously assumed to have inspired the proceedings in Tennessee and Mississippi.

The proceedings in question are indicated in the following circulars, dated in one case on the very day after the announcement of the meeting of the board of health of Louisiana; before, therefore, there could have been any concert of action between the authorities of Tennessee and the member of the National Board of Health resident in New Orleans, and before the fact of such a meeting was known at the office of the National Board of Health in Washington.

OFFICE OF STATE BOARD OF HEALTH,
Nashville, Tenn., July 14, 1880.

Whereas, one death from yellow fever and two other cases have occurred in New Orleans among the crew of the coffee-ship *Excelsior*, from Rio de Janeiro; and

Whereas the history of said ship, as recited at a meeting of the Louisiana State board of health, held in the city of New Orleans on the 12th instant, conclusively shows that the vessel and her cargo are infected with yellow fever; that her infected cargo is now stored in a warehouse in that city; that her captain, some members of her crew, and a large number of visitors, as well as the persons (seventy-five or more) who were engaged in and about said infected vessel in breaking out cargo and in handling, draying, and in storing her infected merchandise are scattered throughout said city; and

Whereas this board is charged with the duty of protecting the public health of this Commonwealth against the introduction of contagious and infectious diseases, and believes such introduction is now seriously threatened by the above-described condition of affairs at New Orleans, it is therefore hereby ordered—

First. That on and after the date of this publication no freight car over any rail-

road, nor any steamboat or other water craft departing from the city of New Orleans after the 15th day of July, 1880, and until further orders, shall be allowed to enter the State of Tennessee nor to make a landing upon the borders of the State for the purpose of transacting any business whatsoever, unless said car, boat, or water craft shall present to the proper officers of this board a certificate from an officer or agent of the National Board of Health to the following effect:

(a) That said officer or agent of the National Board of Health has personally examined the freight of such car, or the cargo, passengers, officers, and crew of such steamboat or water craft, and has satisfied himself of the freedom from infection of said vehicle and its contents (persons and things).

(b) That the freight or cargo comprises none of the following articles of the list recommended by the Louisiana State board of health to be subjected to obligatory quarantine and purification, to wit: Clothing, personal baggage, and dunnage, rags, paper, stock, hides, skins, feathers, hair, and all other remains of animals; cotton, hemp, woollens, and coffee; nor any of the following additional articles, which are hereby declared contraband of quarantine in this State, to wit: Second-hand bedding, clothing, upholstered furniture, and textile fabrics; moss, jute, and "excelsior" tropical fruits and productions.

Second. That any of the articles above enumerated may be shipped as freight from New Orleans and transported through the State of Tennessee by rail, if carried in close box-cars, securely locked, and in charge of an officer or agent of this board. The expenses of such officer or agent shall be defrayed by the railroad transporting such goods.

Third. That this order shall be enforced on the railroads at the southern State line by the officers of the board appointed for such purpose; and at Memphis, and elsewhere upon the Mississippi River by the wharf-master, or other duly authorized officer. The penalties prescribed by law for the violation or infraction of the orders of this board will be rigidly enforced in carrying out this order.

T. A. ATCHISON, M. D.,
President.

W. M. CLARK, M. D.,
Secretary.

E. W. COLE,
JOHN JOHNSON,
J. D. PLUNKETT, M. D.,
J. M. SAFFORD, M. D.,
E. M. WIGHT, M. D.,
Members.

The following circular, relating to the same subject as the preceding, was issued by the State board of health of Mississippi:

OFFICE OF MISSISSIPPI STATE BOARD OF HEALTH,
Jackson, Miss., July 16, 1880.

Whereas the bark *Excelsior*, from Rio de Janeiro, laden with coffee, having arrived at New Orleans infected with yellow fever; and

Whereas her cargo is now stored in a warehouse in the latter city, and it is said a number of persons who were engaged on or about said bark in unloading, draying, and storing her cargo are now in said city, it is therefore hereby ordered—

First. That on and after this date, and until further orders, no car or train of cars departing from the city of New Orleans shall be allowed to enter this State, and no steamboat or other water craft from said city shall be allowed to land passengers at any point in this state unless they have undergone an inspection by an officer of the National Board of Health, as is provided in the rules of said Board, and are provided with a certificate of such inspection.

Second. That no part of the cargo of the bark *Excelsior*, and no freight from the warehouse in which said cargo is stored, shall be brought to any point in this State.

Third. That no person from New Orleans shall be allowed to come to any point in this State unless they hold a certificate from an officer of the National Board of Health that they have not been exposed to infection.

Fourth. That the chief health officers of the counties and the municipal boards of health are charged with the enforcement of this order, and any violation thereof will be punished as is provided by law.

WIRT JOHNSTON, M. D.,
ROBERT KELLY, M. D.,
Executive Committee.

Approved.

J. M. STONE, Governor.

There was nothing in these orders to justify the violence with which they were denounced in an official report to the acting governor of Louisiana as "unnecessary, unwise, ungenerous, and unconstitutional." The action of Tennessee and Mississippi in the premises was in complete accordance with the principles laid down in the rules of the sanitary council of the Mississippi Valley, in the formation of which the then president of the board of health of the State of Louisiana, and other delegates from New Orleans, had taken an active part. Their action was not designed to stop commerce, but only to regulate it, and to regulate it in the very way that had been suggested and solicited by the existing local board of health, namely, by establishing sanitary inspections of freight and passengers about to leave the city, with, of course, as a corollary, the delivery of certificates by the inspectors. With proper certificates, passengers, and freights, except such articles of freight as all sanitarians considered to be particularly dangerous as vehicles of infection, were not to be subject to interruption.

But the National Board of Health, besides being falsely charged with complicity in the matter of issuing these orders, had about the same time given great offense by refusing a request of the Louisiana board for pecuniary aid to be expended on the quarantine stations of New Orleans. The following correspondence in relation to that request states the grounds on which the National Board was constrained to return an unfavorable answer: . .

NEW ORLEANS, LA., June 25, 1880.

DEAR SIR: I have the honor to state that the communication of the president of the National Board of Health of the 15th instant was laid before the board of health of the State of Louisiana at the regular meeting June 14, 1880.

The board of health authorized the president to express the conviction that the inspection of the railroads is equally important with the river-inspection service, and that both are essential to give confidence to the surrounding States and towns. The river-inspection service would be comparatively valueless without the railroad inspection, of which facts the faithful and efficient corps of inspectors have given many proofs. Dr. Rice, of the National Board (inspector) is in full accord with the State board on this subject. Up to the present moment the parties interested in the railroads and steamboats have yielded cheerful acquiescence to all the rules and regulations of the inspection service.

The board of health of the State of Louisiana respectfully submits to the consideration of the National Board of Health the following estimate of the funds needed for the efficient conduct of the quarantine stations and for the sanitary operations in New Orleans in the event of the appearance of yellow fever.

1. MISSISSIPPI QUARANTINE STATION.

Boat and light-house	\$700
Steam launch	1, 100
Repair of hospital buildings	2, 200
	<hr/>
	\$4, 000

Total amount required for Mississippi quarantine station, \$4,000.

The buildings need immediate repair, and the State board of health is without the necessary means to execute them, and hence the appeal to the National Board of Health. It is believed that with the amount specified the efficiency of this quarantine station will be greatly promoted.

2. ATCHAFALAYA QUARANTINE STATION.

This station, situated in the Atcharalaya River, below Morgan City, is without the necessary buildings for discharging and stowing the cargoes of vessels and for the treatment of the sick. The State board of health is without the means of erecting the necessary buildings, and respectfully urges the National Board of Health to appropriate the sum of \$2,000 for the construction of a warehouse and hospital at this station.

3. RIGOLETS QUARANTINE STATION.

The quarantine station at the Rigolets is located in Fort Pike. The State of Louisiana possesses no buildings at this point. The State board is unable to erect the necessary buildings in a more suitable location, and hence this appeal to the National Board of Health for an appropriation not less than that indicated for the Atchafalaya quarantine station.

4. PROBABLE EXPENDITURE NECESSARY IN CASE OF A YELLOW-FEVER OUTBREAK IN NEW ORLEANS.

It is the opinion of the State board of health that in the event of an outbreak of yellow fever at least \$10,000 will be needed for sanitary operations.

Respectfully, your obedient servant,

JOSEPH JONES, M. D.,
President Board of Health.

Prof. JAMES L. CABELL, M. D., LL. D.,
President National Board of Health, University of Virginia.

NATIONAL BOARD OF HEALTH,
Washington, D. C., July 14, 1880.

SIR: I have the honor to inform you that your communication of June 25, relative to railroad inspections and estimates of funds needed for quarantine stations at New Orleans, &c., has been laid before the executive committee, and that I am directed to reply as follows:

1. The railroad inspections have been ordered to be continued for the time being, and Drs. Stephen Smith and R. W. Mitchell, of this board, will visit New Orleans to confer with Dr. Bemiss and yourself upon the necessity for keeping up such inspections when yellow fever is not present. In this matter the committee desires to do everything that is necessary to secure confidence on the part of the surrounding communities.

2. As to furnishing funds for construction or repair of buildings at the Mississippi River, Rigolets, and Atchafalaya stations, after careful consideration this board heretofore came to the conclusion that the cost of furnishing aid to construct hospital buildings, &c., at each maritime port of the Southern and Gulf coast requiring such aid, would be so great in comparison with the results to be obtained as not to be justifiable, and that the necessities of the case could be equally well met by fitting up certain complete refuge or quarantine hospital stations, where all the apparatus needed for dealing with an infected ship might be placed, and where such infected ships could be sent for treatment.

Therefore, after consultation with the principal shippers and merchants of New Orleans, the National Board made arrangements to establish such a station at Ship Island for ships known to be infected and bound for Mississippi and Louisiana ports.

In view of this action the committee does not deem itself justified in expending more money upon hospital accommodations, &c., for the Atchafalaya, Rigolets, or Mississippi River stations of New Orleans.

In addition to this, the committee is of opinion that it would not be justified, unless under very exceptional circumstances, in expending the funds under its control for repairs to buildings of a *permanent character* not being the property of the United States.

3. In case of the occurrence of yellow fever at New Orleans, this Board will promptly give to the State board all aid within its power necessary for preventing the spread of the disease, and for this purpose will pay for a certain number of inspectors, sanitary policemen, &c., being guided in this respect by the recommendations of its resident member, Dr. Bemiss, to whom instructions will be given upon this point. In this connection it may not be either superfluous or premature to suggest that any work to be paid for by the Board should be confined to the immediate vicinity of the infected locality; that is, for instance, the Board cannot undertake to meet the expense of cleansing and disinfecting a large section of the city because of the existence of yellow fever, say, upon a *single square*.

Very respectfully, &c.,

J. L. CABELL,
President National Board of Health.

Dr. JOSEPH JONES,
President State Board of Health, New Orleans, La.

OFFICE BOARD OF HEALTH,
STATE HOUSE, STATE OF LOUISIANA,
New Orleans, July 18, 1880.

SIR: I have the honor to acknowledge the communication of the president of the National Board of Health in answer to the application of the board of health of the State of Louisiana for aid from the National Board in accordance with the law requiring said Board to aid local boards in the establishment and maintenance of quarantines, &c. The communication of the National Board will be laid before the State board of health, and also before the governor, Senators, and Representatives of Louisiana.

Respectfully, your obedient servant,

JOSEPH JONES, M. D.,
President Board of Health.

J. L. CABELL, M. D., LL. D.,
President National Board of Health, University of Virginia.

The National Board of Health recognized, of course, its exclusive responsibility for the action of which complaint was thus made to the governor and members of Congress of Louisiana.

A few days later a new complaint was made against this Board in the most public manner for official orders issued by the Mobile board of health and by the State board of health of Mississippi, but promulgated at their request by Dr. C. A. Rice, supervising inspector of the National Board of Health at New Orleans. The following were the orders in question:

OFFICE SUPERVISING INSPECTOR,
PORT OF NEW ORLEANS, LA., July 29, 1880.

DEAR SIR: The Mobile board of health instructed me "not to allow the shipment of any coffee from New Orleans to Mobile until after they are satisfied that it is not a part of the cargo of the bark *Excelsior*, and they so inform you. You will therefore stop the shipment of any and all coffee to Mobile from and after this date until further orders.

This I do not understand to apply to coffee going to other portions of Alabama in sealed cars.

Respectfully,

C. A. RICE, M. D.,
Supervisor of Inspectors National Board of Health.

Dr. J. M. WATKINS,
Sanitary Inspector.

OFFICE SUPERVISOR OF INSPECTORS,
Port of New Orleans, July 29, 1880.

DEAR SIR: The State board of health of Mississippi having revoked the ordinance requiring personal certificates of passengers coming from New Orleans, La., into the State of Mississippi, you will inform all persons so applying. The same board has passed an ordinance on this the 29th July, 1880, "That no part of the cargo of coffee from bark *Excelsior* will be permitted to come into the State of Mississippi, and that no coffee received at this port subsequent to this date from an infected port will be permitted to come into the State of Mississippi." You will act accordingly. All other coffee now in the city will be permitted to come into the State of Mississippi.

Respectfully,

C. A. RICE, M. D.,
Supervisor of Inspectors National Board of Health.

Dr. J. M. WATKINS,
Sanitary Inspector.

On the following day the president of the board of health of Louisiana addressed a communication to the National Board at Washington to protest against the alleged assumption by its agent in New Orleans of authority to control the shipment of coffee from New Orleans to the entire State of Mississippi, and, without waiting to ascertain whether this Board would sustain, or on the other hand disavow, the assumption of power imputed to Dr. Rice, he, on the same day, sent a similar communication to the acting governor of Louisiana, in which he expressly

charged the National Board of Health with having issued the objectionable orders, and denounced its action as "illegal and unconstitutional." This communication was also given to the daily papers for publication. In point of fact, as will be readily perceived, the orders emanated from the health authorities of Mobile and of Mississippi, and were promulgated by Dr. Rice, an agent of this board, by their authority, with the simple view of warning shippers that the article, if shipped, would be declared contraband of quarantine, and would not be permitted to enter the ports referred to. The State board of health had previously been informed by official communications from the National Board that the latter disclaimed any authority to interfere with the shipment of goods, or even to make inspections of steamboat freights, *except at the request of the owners or captains of the boats*. The following letter relates to this subject:

NATIONAL BOARD OF HEALTH,
Washington, D. C., August 10, 1880.

SIR: Your communication of July 30, relative to the action of Dr. C. A. Rice, concerning the shipment of coffee from the port of New Orleans to Mobile, and to ports and places within the State of Mississippi, was duly received. A reply thereto was deferred until a report could be received from Dr. Rice, to whom, on the receipt of your communication, a letter of inquiry was addressed. I now find that Dr. Rice had anticipated the receipt of that letter, and had on the 5th of this month addressed a communication to the acting governor of Louisiana, furnishing an explanation of his action in the premises. This Board has also received by yesterday's mail a copy of a letter addressed to you by Dr. Bemiss the 2d of August. These two communications by a member of this Board and by one of its agents are approved by the executive committee, and cover the ground so well as to supersede the necessity for any more elaborate explanation.

It appears so obvious that the orders of Dr. Rice, though expressed in somewhat unguarded language, could have no other significance than that which is explained in his communication to the acting governor, that I cannot withhold the expression of my great surprise that after the explanations heretofore given you of the principles which have invariably guided this Board in the management of the inspection service at New Orleans, and your avowed concurrence, you should now seek occasion to ascribe to it or its agents any disposition to assume powers which it has never exercised or claimed to possess, and for the attempted exercise of which it would have incurred a great responsibility.

In this connection I refer to my letter of June 15, and your reply thereto, dated June 25.

I have now to say that in no instance has this Board violated the principles avowed in my letter to you, and that if any of the inspectors at New Orleans, whose salaries are paid by this Board, and most of whom were nominated by yourself, have transgressed their authority, such act on their part will be disavowed and proper instructions promptly given.

I may observe, however, that even before receiving Dr. Rice's version of the matter the executive committee of this Board were of the opinion that the facts cited in your letter of July 30 did not sustain the interpretation you seemed desirous to put upon them. The committee was well assured that Dr. Rice could not possibly have meant to assert an authority which he had no means of enforcing, and the assertion of which would have been in direct violation of his instructions.

With reference to the last sentence of your letter, in which you complain of the action of Dr. Rice on the ground that it was taken "without the advice or co-operation of the lawful authorities to whom are confided by legislative enactment the conduct of the sanitary and quarantine affairs of the State of Louisiana," I have again to repeat the statement in my letter of June 15, that the whole of this river and railroad inspection service is intended for the protection of other States than your own, and is in aid of their health authorities. Incidentally, indeed, it was designed and has proved to be of great advantage to the commerce of New Orleans, since on the bare suspicion of a single case of yellow fever existing there the health authorities of the Mississippi Valley, and of other places in the South having commercial relations with that city, have declared that they will maintain a strict quarantine against it unless the inter-State commerce be carried on in accordance with the rules of the inspection service. The authorities have it in their power to protect their towns by a very simple and effective machinery. This Board has induced them to forego the use

of such machinery and to consent to an arrangement which has proved highly advantageous to the commercial interests of New Orleans, and yet it encounters at the hands of the health authorities of Louisiana constant opposition and detraction. It is needless to say that it will continue to discharge its duties in aid of the health authorities of other States and municipalities, notwithstanding the present opposition of the State board of health of Louisiana.

* * * * *

I will further add, as suggested by the general tenor of your communication, that while the acts of Congress require the National Board of Health to co-operate with and, so far as it lawfully may, to aid State and municipal boards of health, it was obviously for the purpose of ascertaining and deciding when and in what manner such aid should be given that a national Board was created. Had this not been so, and had Congress intended to allow each State and each municipality to decide these questions for itself, it would doubtless have dispensed with any intermediate instrumentality and have authorized each local authority to make its requisition directly on the Treasury Department for funds needed to carry out its objects.

Respectfully,

J. L. CABELL,
President National Board of Health.

Dr. JOSEPH JONES,
President of State Board of Health of Louisiana, New Orleans, La.

Dr. Rice, of the National Board of Health, forwarded the subjoined communication to the acting governor:

OFFICE SUPERVISOR OF INSPECTORS,
Port of New Orleans, August 5, 1880.

SIR: Fearing the mischievous effects of further delay in presenting to yourself the facts relating to the action of this office concerning the shipment of coffee from New Orleans, I venture to thus address you without longer awaiting the expected reference from you of the communication from the president of the Louisiana State board of health on the subject, and which has already been published in the daily papers.

That communication is based upon an entire misapprehension of the functions and authority of the National Board of Health and of its agents and representatives. In the absence of epidemic disease its functions are purely advisory and declaratory; its authority is limited to the issue or refusal of certain certificates based upon the results of certain inspections. It can no more "stop," "forbid," or "prohibit" the shipment of coffee or of any other article from a port not declared infected than it can usurp the prerogatives of your office. Nor has it, or its agents or representatives in this city or elsewhere, to my knowledge, ever undertaken to do anything of the sort. The order to Inspector Watkins was clearly understood by him (though its phraseology may not have been as cautiously worded as it ought) to mean "stop" the shipment as far as his authority went; that is, to inform shippers that it had been declared contraband of quarantine by the health authorities of Mobile and the State of Mississippi, and that its shipment would necessitate its return. Its publication was simply to notify shippers and public carriers that such ordinances were in existence. If the shipper still persisted in its shipment it was understood by him and by all shippers who have had any transaction with the inspection service, that he would indorse the facts of the shipment on the certificate or withhold such certificate, and that information would be given to the authorities at the point of destination of such shipment, who alone have the power to stop it.

It hardly seems necessary, with your excellency it must be entirely superfluous, to enter into any elaborate exposition of the advantages of such an agency for New Orleans. In its absence the State and local boards of health would have established quarantine stations at their State lines or near their municipal limits. The first intimation the shipper or railroad company would receive of the interdict would be the stoppage of a train and its indefinite detention, or its arbitrary turning back by force if necessary. Further, the want of authentic information from an agency possessing the confidence of these State and local authorities would have led in this instance, as in numberless others in the past, to a multiplication of ordinances, interdicts, and requirements, changing every day or hour with each new rumor of the panic-moved and apprehensive authorities, until the entire commerce of New Orleans would have been again paralyzed, as it has so often been before by equally inadequate causes.

I have yet to learn that either the shippers of New Orleans or the railroad and shipping interests of the city prefer the old way to the present system.

What of inconvenience or pecuniary loss has been suffered since the entry of the bark *Excelsior* to New Orleans has been due to the requirements of the health orders of the States and one or two cities. Whether these requirements would have been

fewer, less stringent, or less onerous, and whether the consequent interruption to commerce would have been less annoying, vexatious, and expensive in the absence of the inspection system of the National Board of Health, are questions which may safely be left with those most directly interested, viz, the merchants, railroads, and steamboats.

I am, sir, very respectfully, your obedient servant,

C. A. RICE, M. D.,
Supervisor of Inspectors, National Board of Health.

His Excellency S. D. MCENERY,
Acting Governor of Louisiana.

It was supposed that this emphatic disclaimer by the National Board of Health with reference to the alleged usurpation of Dr. Rice, and by Dr. Rice himself in his letter to the governor, of any purpose or desire to exercise authority in the matter of shipping coffee or any other freight by railroad or river at New Orleans, would satisfy the complainants. In point of fact it did silence them for the time, but the persistent hostile *animus* was subsequently displayed by the president of the board in his annual report for the year 1880, by a strongly colored statement in which the charge of "illegal and unconstitutional assumption of power by the National Board of Health" was reiterated, and the explanations given by the Board and by Dr. Rice were deliberately suppressed. Moreover, within a month after he had, on behalf of the State board of health, asked for a resumption of the river inspection service, expressing his conviction that both that service and the inspection of railroads were "*essential* to give confidence to the surrounding States and towns," he denounced the National Board for having complied with his request, and for having instituted a system which he characterized as "expensive and cumbrous." An attempt was also made to fasten upon the National Board the odium of having excited panics in regard to the prevalence of yellow fever in the vicinity of New Orleans, and for creating a distrust on the part of surrounding communities as to the fidelity of the State board in reporting early cases of infectious diseases. It is needless to say that such distrust, whether merited or not, long antedated the existence of the National Board, and that, as has been well said, "history does not furnish a single instance in which pledges of prompt notification of such diseases by the authorities of a place habitually or frequently infected have ever secured the confidence of adjacent communities occasionally but not habitually infected." That the health authorities of New Orleans were more frequently than others the objects of such distrust was due to the simple fact that their city was more frequently infected and was the key to the commerce of the entire Mississippi Valley.*

The sanitary council of this valley met in New Orleans December 9 and 10, 1880, at or about the time of the annual meeting of the Ameri-

* The present generation in the Mississippi Valley is not likely to forget that while in 1878 there was not a certified death by yellow fever in New Orleans until July 21, yet that there had been unreported suspicious cases and deaths during the preceding three weeks at least, and that the tow-boat John D. Porter, which left New Orleans as early as July 18, had on board twenty-six cases and fourteen deaths by yellow fever between said city and Gallipolis, Ohio. The great additional devastation attributed to this boat was registered by Port Gibson and Vicksburg, Miss., by Hickman, Ky., and by Gallipolis, Ohio. This sad incident is only one of many others which teach the lesson that *prompt warning* should be given, *even of suspicious cases*, to at least those sanitary authorities interested. The ethics of all civilized nations now adopt as an axiom the principle that, in a conflict between public health and commerce, precedence must be given the former. (Report of Dr. S. E. Chaillé, Supervising Inspector, N. B. H., 1881.)

can Public Health Association, and immediately after a quarantine convention which had been called by the State board of health. At this meeting the State board of health was not represented as on previous occasions, but the Auxiliary Sanitary Association of New Orleans, consisting of prominent citizens of the mercantile, legal, and medical professions, was represented by its chief medical officer, and further manifested its interest by placing the rooms of the association at the disposal of the council. On this occasion the council gave expression to the view which has been expressed above by passing unanimously the following resolutions:

Whereas experience has shown that measures of quarantine, under the sole direction of local and State boards of health, have not succeeded in protecting this valley from invasions of yellow fever; and

Whereas our people habitually view with distrust all announcements and sanitary acts of local boards, when those acts and announcements are of a character to affect the commercial interests of the locality directly concerned; Therefore be it

Resolved, That in our opinion the General Government alone, acting through its constituted sanitary agents, should have the direction and control of national and maritime quarantine.

Again—

Whereas there is, unfortunately, a want of confidence with regard to the prompt furnishing of information by the health authorities of New Orleans with reference to infectious or contagious diseases: Therefore be it

Resolved, That in the opinion of this council it would undoubtedly tend to the restoration of confidence if the State board of health of Louisiana would request the National Board of Health to place an inspector at the Mississippi quarantine station and one at New Orleans, who shall have access to the records of the board of health, and be furnished every facility for obtaining reliable information with regard to all cases deemed suspicious, and especially with regard to yellow fever.

As has been seen, the State board of health had previously on two occasions asked for the appointment of inspectors in New Orleans. The extension of this system to the quarantine station, the primary focus of infection in most cases, was but a precaution of the same kind, and it was not supposed that this suggestion of the sanitary council would be more objectionable than the other features of the river and railroad inspection service, which had been fully indorsed by the State board itself. It was, however, very vehemently denounced as an insulting proposal for the establishment of a system of espionage on that board.

The National Board of Health being desirous to obtain the co-operation of all the interested parties in carrying out measures which would give a general feeling of confidence and security, and thus prevent the imposition of vexatious and burdensome restrictions on commerce, felt it to be a duty to make to the State board the proposals indicated in the following letter:

WASHINGTON, D. C., *February 19, 1881.*

SIR: I am directed by the executive committee of the National Board of Health to address a communication to you relative to the resumption by the Board of the system of sanitary inspections at New Orleans of railroads and river craft which was put into operation last summer at the request of the State boards of health of several of the Mississippi Valley States, including that of the State of Louisiana, as represented by yourself.

This Board is willing to renew these inspections for the coming season, but before assuming the responsibility involved in such action, it desires to know whether it will have adequate facilities for obtaining the information necessary to enable its inspectors to furnish positive and trustworthy certificates. To this end I am instructed to inquire whether the State board of health will accede to the following propositions:

1. That an inspector of the National Board be stationed at the Mississippi quarantine for purposes of observation and inquiry, who shall have the privilege of inspecting, in company with the quarantine officer, all vessels arriving at the station, and

who in the event of a difference of opinion between himself and the quarantine officer as to the actual sanitary condition of such vessels, and to the treatment which they require, shall send to the president of the State board a copy of his report made to the National Board.

2. That an agent of the National Board to be stationed in New Orleans shall have access to the daily reports of deaths received by the State board and of sickness when reports of sickness are made, and that whenever either the agent of this Board or the health authorities of the State receive information of the alleged existence of one or more cases of disease of a doubtful or suspicious character as to its being infectious, the State board agrees to send one of its officers, who, together with the agent of the National Board, shall investigate the case, the two parties reporting the result to their respective boards.

An early answer to these inquiries is respectfully requested.

Respectfully, yours,

J. L. CABELL,
President National Board of Health.

Dr. JOSEPH JONES,
President State Board of Health of Louisiana.

This communication was not submitted to the board of health of Louisiana until at its regular monthly meeting, March 10, 1881. In the interim the executive committee of the New Orleans Auxiliary Sanitary Association addressed a similar request to the State board in a form of resolutions adopted February 26, 1881. To this request of their fellow-citizens no response was made until March 26. At the regular monthly meeting of the State board on March 10, a lengthy statement was adopted and ordered to be communicated to the National Board as a reply to its letter of inquiry of February 19. That statement, along with several other documents bearing on the subject, may be found in the Annual Report of the National Board of Health for 1881 (pp. 305-310 inclusive). Let it suffice to say that in these replies the State board reaffirms "its former position of cheerful consent" to the "resumption by the National Board of Health of the system of sanitary inspectors at New Orleans of railroads and river craft," and declares its purpose to "co-operate in making these inspections as useful and as perfect as possible." It is further said that "the board trusts that the several States of the Mississippi Valley will continue their adhesion and support to a work so desirable and important."

With regard to the proposition that there should be an inspector of the National Board stationed at the Mississippi quarantine, it was intimated, somewhat vaguely at first, but more definitely on a subsequent occasion (April 19), that the board of health of Louisiana was "without power to nominate or appoint any Mississippi quarantine station inspector whatever, and refers the matter of such nomination and appointment to his excellency the governor." Prior to this latter action of the State board the New Orleans Auxiliary Sanitary Association had appealed to the governor to grant the two requests of the Sanitary Council of the Mississippi Valley, as is shown by the following extract from the proceedings of the association of April 2, 1881:

To his excellency Louis A. Wiltz, governor of the State; Hon. Joseph Shakspeare, mayor and administrator; Thomas L. Airey, president of Cotton Exchange; E. K. Converse, president Produce Exchange; Cyrus Bussey, president Chamber of Commerce:

At a meeting of the Auxiliary Sanitary Association held on the 26th of February the following preamble and resolutions, embodying substantially views previously expressed by the Sanitary Council of the Mississippi Valley, the Chamber of Commerce, and the New Orleans Medical and Surgical Association, were adopted with but one dissenting vote, and were subsequently approved by the signatures of hundreds of the most prominent business and professional gentlemen of the city:

"Whereas the Sanitary Council of the Mississippi Valley, composed of the members of the boards of health and of the sanitary officers of the States and municipalities

adjacent to and in closest relations with New Orleans, has requested the Louisiana State board of health to invite a representative of the National Board of Health to attend all the meetings of the said Louisiana State board of health, and to have free access to all its sources of information concerning the sanitary condition of New Orleans and its vicinity during the season of danger from yellow fever, and another representative to be stationed at the Mississippi River quarantine station during the same period and with similar privileges; and

"Whereas it is evident that only by compliance with this request unreasonable apprehensions of danger can be anticipated, and premature and unnecessary restrictions upon commercial and personal intercourse with New Orleans be prevented; and

"Whereas large allowance should be made by New Orleans for the easily excited fears of those communities whose protection against yellow fever is supposed to depend to a considerable extent upon early and accurate information concerning its appearance and progress in this city and neighborhood, and that every rational concession should be made to secure their confidence and good-will:

"Resolved, That the Louisiana State board of health be urgently requested to reconsider its late action in regard to this question, and to acquiesce in what has been asked by the Sanitary Council of the Mississippi Valley."

In addition, because of the vital importance of the subject, and the long interval of more than four weeks between the regular meetings of the State board of health, the association passed a resolution politely asking the board of health to hold a special meeting for the consideration of the question. No response whatever was made to this request, nor did the board at its subsequent regular meeting take the slightest notice of the communication, not even so much as to acknowledge its receipt. However, at this same meeting of the State board a letter of a similar character from the president of the National Board of Health was read, and definite action upon its contents postponed for another month by a resolution referring certain unimportant legal technicalities to the attorney of the board and the attorney-general of the State.

Referring to the above-cited request of the Sanitary Council of the Mississippi Valley, the communication proceeds as follows:

What can be more just or equitable to the numerous States of the valley of the Mississippi, which are by geographical position and commercial relations as deeply interested in the sanitary regulations of the outlets of the great river as the citizens of New Orleans themselves? No demand is made for any participation in the powers or authority of the State board; no discreditable reflection is made upon the dignity of this body, no slight is put upon a single one of its members. All that is asked is that the National Board of Health be granted equal opportunities for obtaining prompt and accurate information concerning sickness or suspected sickness of an infectious nature which may occur in or near New Orleans or upon the vessels which enter her waters and threaten to extend to neighboring States. We have no evidence that this has been acceded to, and the object of this address is to urge you to consider the serious results which are likely to follow. On the 20th of April the Sanitary Council of the Mississippi Valley, which, although a "voluntary association," is nevertheless an association of sanitary authorities, and thereby wields an immense power over the sanitary regulations of the States adjacent to the Mississippi River and its tributaries, will hold its annual session at Evansville, Ind. We are positively assured that at this meeting, unless the Louisiana State board of health shall in the mean time revise its former action, and grant without reservation the reasonable request which has been made, measures of self-preservation will be recommended to the respective States, and New Orleans will in all probability be isolated during the whole ensuing summer by a most effective system of interior quarantine.

We have no new suggestions to make as to how this impending calamity may be averted, but whatever is to be done should be done quickly. We, as an association, have performed our duty in the premises to the best of our knowledge and ability, and can now only make this our earnest appeal to your superior authority, and leave the matter entirely in your hands.

To this communication were appended the legal opinions of several distinguished members of the bar of New Orleans as to the power of the State board of health to grant the request of the National Board, and of the sanitary associations in whose behalf the application had been made. The gentlemen consulted were Messrs. J. A. Campbell, R. H. Marr, H. C. Miller, W. W. Howe, E. D. White, J. B. Eustis, and Henry J. Leavy, attorney for the New Orleans Auxiliary Sanitary Association. They were unanimously of opinion that the board had full power to grant the

request at its discretion. Nevertheless, the board itself took a different view as to the extent of its powers, and as late as April 19 adopted this resolution :

Resolved, That this board is of opinion that it is without power to nominate or appoint any Mississippi quarantine station inspector whatever, and refers the matter of such nomination and appointment to his excellency the governor.

A few days earlier, namely, April 14, it had taken^e occasion to reaffirm, for the third time, its entire approval of the river and railroad inspections. Nevertheless, at the close of the year, in the annual report of its president, the National Board of Health became the object of vehement denunciation on account of these very inspections.

NEW ORLEANS, LA., April 16, 1881.

[Extract from minutes of meeting held April 14, 1881.]

By Mr. Edward Booth :

"Resolved, That this board concurs in the opinion of the State boards of some of the river States that the National Board would do well to commence its river and rail inspections on or about the 1st of May, and that this board cordially indorses the invitation already extended by its president to such inspector or inspectors as may be commissioned by the National Board of Health to occupy the commodious room adjacent to and communicating with the rooms and offices of this board at the State capital, and that the inspector or inspectors aforesaid are requested and urged to be present as auditors and spectators at the meetings of this board, with a view to give efficiency to the wishes of the National Board of Health, expressed through its president, Dr. Cabell, under date of February 19, that it may have adequate facilities for obtaining information necessary to enable its inspectors to furnish positive and trustworthy certificates."

The resolution was adopted by the following vote :

Yeas—Messrs. Hernandez, Marks, Formento, and Booth.

Nays—Messrs. Loeber, Brewster, and Beard.

A true copy.

S. S. HERRICK, M. D.,
Secretary Board of Health.

NATIONAL BOARD OF HEALTH,
Washington, April 26, 1881.

SIR : I am directed by the executive committee of the National Board of Health to acknowledge the receipt of your communication of the 15th instant, transmitting extracts from the minutes of the board of health of Louisiana of April 14, 1881, and to inform you that Dr. S. E. Chaillé, of New Orleans, has been appointed supervising inspector of the National Board of Health for the coming season. I am further instructed to say that, in accordance with the recommendations of your board, and those of other State boards of the Mississippi Valley, the river inspections will commence on or about the 1st of May. On behalf of the executive committee I return it thanks for the offer of a commodious room to be occupied by the agent of the National Board in the same building with and adjacent to the rooms of the State board. The invitation to be present at the meetings of the State board will be communicated to Dr. Chaillé, who will be instructed to use his own discretion in the matter.

Very respectfully, yours,

J. L. CABELL,
President of the National Board of Health.

Dr. JOSEPH JONES,
President of the State Board of Health of Louisiana.

It deserves to be mentioned that the appointment of Dr. Chaillé, referred to in the foregoing letter, was made in deference to the wishes of members of the medical profession in New Orleans who desired to co-operate with the National Board of Health, and who thought that the delicate and grave responsibility attaching to the position should be confided to one of their own citizens rather than to a stranger, who might be wholly indifferent to the commercial interests of the city. In deference to this feeling on the part of the community, this Board re-

considered a previous decision by which an offer was to be made to a former agent of the Board who had exhibited unusual energy and ability in making a sanitary survey of all the Texan ports, and appointed Dr. S. E. Chaillé, a very distinguished physician and sanitarian of New Orleans, all of whose material interests were identified with those of the city in which he lived, and whose character and reputation gave a guarantee of fidelity to the important trusts committed to his keeping. In entering upon the discharge of his duties, he addressed to the State board a communication, conceived in an admirable spirit, in which he discussed with frankness and ability the points in regard to which there appeared to be some divergence of opinion between the State board on the one hand, and the National Board, sustained by the Auxiliary Sanitary Association of New Orleans and the Sanitary Council of the Mississippi Valley, on the other hand.

The following extracts from his official correspondence with the State board are pertinent in this connection :

To the Louisiana State Board of Health :

GENTLEMEN: In your report adopted May 19, in reply to the five propositions of the National Board submitted to you on May 13, you use the following encouraging language:

"We consider it our duty, we deem it is due both to ourselves and to our fellow-brothers of the National Board, to give fully and explicitly our honest opinions and convictions on subjects of such vital importance as those that relate to public health. We hereby reiterate our most earnest desire to extend our friendly relations with all sanitary organizations, with the National Board more particularly. The object we are striving for is the same; public health is our aim and ambition. We of the Louisiana State board shall always be found ready to co-operate, to the utmost limit of our power to do so, in all measures having in view the interest and welfare of our common country."

The present representative at New Orleans of the National Board heartily reciprocates these sentiments, which encourage him to believe that you will patiently listen to some "honest opinions and convictions" opposed to your own, and that you are as anxious as he is to rid every question between you and the National Board of all misapprehensions and false issues.

On one subject, which may be termed the Eadsport and Ship Island quarantine question, it is respectfully but firmly believed that your report gives proof of serious misapprehensions respecting the position of the National Board on this question. Inasmuch as this same position has been taken by the Sanitary Council of the Mississippi Valley, and also by the Auxiliary Sanitary Association and the Medical and Surgical Association of New Orleans, it is not likely that discussion will cease until all misapprehensions have been removed and some general conclusion has been reached on the true issue. As to what I may say on this subject, I beg leave to remind you that, although I represent in this city, for the summer only, the National Board, I still remain one of your constituents; that, as a citizen of New Orleans, my love for it, my home reputation, and my money interests, all located here, greatly exceed any temptations which the National Board could possibly present me; and, therefore, that my convictions are not those of a salaried partisan, but a fellow-citizen, who has the permanent welfare of New Orleans nearest his heart, and who cannot be in any way so greatly benefited as by promoting its prosperity.

He then proceeded to notice and answer in a perfectly respectful and conciliatory tone the several objections made by the State board to the request that infected vessels should be prohibited from entering the Mississippi River until they had been thoroughly disinfected at the Ship Island refuge station.

"Such a regulation," he predicted in a second communication, dated June 16, "would cause three good results: It would induce those who control vessels bound to this port to adopt better sanitary measures for protecting their vessels from becoming infected; it would furnish additional protection to this city, and it would very surely give an additional feeling of security and great satisfaction to all communities in close commercial intercourse with New Orleans."

The secretary of the board was directed to acknowledge, and did in fact acknowledge, the receipt of this last communication, but no reply was ever received to the request which it contained.

A few weeks prior to the date of the last-mentioned communication an application had been made to Governor L. A. Wiltz, to which, however, no answer had then been received, owing, it is believed, to the absence and ill-health of his excellency. The application was made by the following letter:

WASHINGTON, May 17, 1881.

SIR: I am instructed by the executive committee of the National Board of Health to invite your attention to a proposition submitted on behalf of the said Board to the board of health of the State of Louisiana in a letter of February 10, a copy of which is herewith inclosed. In the published proceedings of the meeting of the State board consequent on the reception of this letter it is stated that the question relative to the placing of an inspector of the National Board of Health would be referred to your excellency.* It is believed that no objection will be made on the part of the State board or of the quarantine officer, and that both are disposed to co-operate with the agent of the National Board in New Orleans in the discharge of the duties which have been assigned to him. I am also directed to say that the National Board desires to maintain at Eadsport an inspecting station, with authority to prohibit the passage up the river of actually infected vessels until the same shall have undergone suitable and adequate disinfection at the refuge at Ship Island. It is not proposed to apply these measures to any other than infected vessels, the proportion of which to the rest of the shipping is so small that there will be no serious interruption to commerce, while the chances of spreading the infection will be greatly diminished. An early reply is respectfully requested.

Very respectfully, your obedient servant,

J. L. CABELL,
President National Board of Health.

Hon. L. A. WILTZ,
Governor of Louisiana, New Orleans.

A very different view from that expressed in the concluding lines of the foregoing letter as to the effects of the proposed measure on the commerce of New Orleans was taken by its board of health. That board made the astounding statement that if this plan were adopted, "Louisiana would no longer need any protection. *It would be entirely ruined, and would soon disappear from the family of States.*" The accuracy of the statement made to Governor Wiltz has fully been established by undeniable statistics. Thus, it is shown in an official report by Dr. S. E. Chaillé that "in 1880 there had not been a single vessel, nor in any one year had there ever been recorded more than six vessels, which presented such evidences of infection that the National Board of Health would have required them to go to Ship Island." Out of 1,271 vessels entering the Mississippi River in 1881 the quarantine officer at the Mississippi station did not retain more than 151, which number, too, was exceptionally large, and of these there was not one which was infected or reasonably suspected of infection. "Only one of the entire number—the bark *Excelsior*—ever gave any evidence either of infection or of reasonable suspicion of infection, and there was no evidence of this at Eadsport, nor until the vessel reached New Orleans."

It may now be added that the wisdom of the measure recommended by the National Board, and for which recommendation that Board was so fiercely denounced, has been fully vindicated by the recent action of

* On April 19 the State board "Resolved, That this board is of opinion that it is without power to nominate or appoint any Mississippi quarantine station inspector whatever, and refers the matter of such nomination and appointment to his excellency the governor."

the State board itself. At a meeting held July 24, 1883, the following resolution was adopted with but one dissenting voice:

Resolved, That the governor of Louisiana be, and he is hereby, requested to issue a proclamation of non-intercourse with ports infected with yellow fever, namely, "
* * * and to order all infected vessels out of the waters of the State, as recommended by him on the 20th instant to this board.

Governor Wiltz had acceded in 1881 to the proposition of the Sanitary Council of the Mississippi Valley that the inspector of the National Board of Health should be stationed at the Mississippi quarantine with certain privileges, but had made no answer to the other proposition relating to the exclusion of infected vessels from the Mississippi River. When this policy was finally adopted by the present governor and by the State board of health, the sanitary council at once withdrew its inspector from the Mississippi quarantine.

Thus, of the three measures which the National Board of Health desired to set on foot within the jurisdiction of the State board, the latter board itself professed a cheerful acquiescence and purpose of co-operation as to the first, that, namely, of sanitary inspections of river craft and railroads, with facilities to be allowed to the inspectors for obtaining reliable and trustworthy information on which to base their certificates. They made no other objection to the second proposition than their want of legal authority to grant it, and this difficulty was removed by the action of Governor Wiltz. It was only the third proposition, for the exclusion of infected vessels from the waters of the State, that encountered fierce and angry opposition on the part of the State board. As its consent was necessary for carrying this proposition into practical effect, no further steps were taken by the National Board after the date of Dr. Chaillé's letter of June 16, 1881.

These three propositions include all the essential points connected with the official relations of the two boards. It is true that for a time the local board attempted, with some success, to create a prejudice in New Orleans against the National Board, because two of its members, Drs. Bemiss and Mitchell, together with one of its agents, Dr. G. M. Sternberg, all yellow-fever experts, had identified that disease in a malignant outbreak in Plaquemine Parish, in the vicinity of the quarantine station, where the infected bark Excelsior lay at anchor. The first case, August 1, 1880, occurred directly opposite the point where the infected vessel was detained from July 11 to August 16.

A different opinion was expressed by two eminent physicians of New Orleans whom Dr. Bemiss had requested to visit the infected locality and to investigate the nature of the local epidemic. They believed the disease in question to be a form of malarial fever, probably dependent on miasms from rice fields in the vicinity. The difficulty of distinguishing between yellow fever and some forms of malignant malarial fever is sometimes exceedingly great, but it is believed that a majority of yellow-fever experts who carefully examined the evidence furnished by the two sets of reports arrived at the conclusion that the disease was truly yellow fever.

It was of some significance that shortly after the reception of these reports the existence of an undoubted case of yellow fever within the limits of the city was announced by Dr. Loeber, acting president of the State board, who was censured by the president on his return to the city for taking such action during his absence.

It should be added that the course taken by the National Board was such as to quiet the apprehensions of the people of the Mississippi Valley by the assurance it gave them that the Board would not be a party

to any suppression of facts or to any system of deceptive coloring of facts. Their course was so fully vindicated as to their motives and as to the results of their action that it was supposed that the State board itself, on calm reflection, had become satisfied of the injustice of the charge that some of the members of the National Board had recklessly and maliciously attempted to create a yellow-fever panic, to the great detriment of the public interests, for during the succeeding winter, and especially in May, 1881, some seven or eight months after the dispute as to the nature of the fever in Plaquemine Parish, a most friendly and courteous correspondence was carried on between the local board and Dr. Chaillé, as the local representative of the National Board. That a different tone was subsequently assumed towards their distinguished fellow-citizen was due to no fault on his part, as will appear from the facts cited in his two reports appended to the Annual Reports of the National Board of Health for 1881 and 1882.

It was well known to be the determination of the health authorities of the surrounding States, and especially those of the valley States, to prevent the future transmission of yellow fever from New Orleans into their respective territories, and yet at the same time to avoid, if possible, a resort to the shot-gun quarantine or any other measure which, however legal, would be an unnecessary interference with trade and travel. To secure such a desirable result two things were considered necessary: First, that the earliest cases should be recognized and acknowledged; and, secondly, that such frank acknowledgment should be accompanied with so candid and full a statement of the attending circumstances as that no panics should be created and no unnecessary restrictions should be placed on the commerce of the locality. The first of these conditions has never yet been fulfilled through the agency of the local authorities of any infected place. There is scarcely an exception to the rule that the earlier cases are either mistaken or misrepresented. The diagnosis of isolated cases is subject to honest doubts, and it is natural that men's minds should incline to the most hopeful view in such cases. But, aside from this source of difficulty, the policy of concealment is often openly avowed and held to be justified by a proper consideration of the magnitude of the interests involved. It is alleged that inasmuch as in a great many instances the occurrence of a few cases introduced from some extraneous focus of infection is not followed by an epidemic, such concealment produces less evil than that which would be incident to a panic caused by a premature publication of the facts. But such a policy ceases to be available when it has to be frequently resorted to, and the time arrives when the suspicions and fears engendered by vague rumors run far ahead of the worst significance of the actual facts, and when, therefore, the candid statement of the latter would have a quieting effect. Such a policy of concealment thus not only fails to secure its immediate objects, but creates a feeling of general distrust as to the official bulletins emanating from the suspected locality. Such was the universal feeling in the valley of the Mississippi towards the health authorities of New Orleans during the summer of 1879.

The origin of the terrible epidemic of 1878 was ultimately ascribed by the health authorities of New Orleans to the steamship *Emily B. Souder*, plying between that city and Havana. The purser came on shore at New Orleans, sick, on the 23d May. The engineer was attacked on the 24th May, after having left the ship. The deaths of these two men were returned by the physicians as being due to "malarial fever," but it is stated as "a significant fact in connection with Clarke's case that he died at 2 o'clock a. m. and was buried at 10 a. m. of the same day,

no public announcement of the death or funeral being made until several days after its occurrence." This statement was made on the authority of the late Dr. S. Choppin, the president of the board of health, who added that the case was not brought to the notice of the board by any direct communication, official or otherwise, but only from information received through rumor. As to the other case—that of the engineer, Thomas Elliot—when notice was received at the office of the board of health that the man had died at the Hotel Dieu under circumstances justifying the suspicion of yellow fever as cause of death, the president and secretary of the board repaired to the hospital to investigate the case. They officially stated at a later date that they had no doubt that the man had been the subject of yellow fever.

And yet, in point of fact, there was not a *certified* death from yellow fever in New Orleans until July 21, although, in addition to the two above-mentioned cases in May, now generally conceded to have started the epidemic, there had been numerous unreported suspicious cases and deaths during the preceding three weeks at least, and the tow-boat John D. Porter, which left New Orleans July 18, three days before the first *certified* report of death from yellow fever, had on board twenty-six cases and fourteen deaths by that disease between that city and Gallipolis, Ohio. This boat scattered the seeds of disease and death as it proceeded up the river, at Port Gibson and Vicksburg, Miss., at Hickman, Ky., and at Gallipolis, Ohio. Could there be a more impressive lesson as to the fatal consequences of a failure to give prompt warning of "suspicious cases" to the sanitary authorities of places holding commercial intercourse with the city which sends forth such cases?

In view of the uncertainty attaching to the diagnosis of suspicious cases, and the gravity of the interests involved, the medical profession in New Orleans, with singular unanimity, decided that for purposes of sanitary precaution the diagnosis of yellow fever ought to be admitted on more slender grounds than would be necessary for a dogmatic conclusion in science. Accordingly, in issuing instructions to Dr. Chaillé the National Board of Health considered it to be its bounden duty to speak as follows:

You will co-operate with and endeavor to secure the co-operation of the Louisiana State board and the other sanitary and medical organizations of the city in securing information as to the presence of cases of yellow fever or of doubtful or suspicious cases of this disease. In doubtful cases, where difference of opinion may arise as to the character of the disease, you will be guided by the rules for this purpose which have been drawn up and approved by the Medical and Surgical Association of New Orleans, a copy of which is herewith appended, marked D. Should a case of yellow fever, or a case which appears to you doubtful or suspicious, occur either in New Orleans or vicinity, you will not announce it, except to the resident member of the Board, the president of the State board of health, the superintendent of river inspection, and secretary of the National Board of Health, and will leave to the secretary of the National Board of Health the responsibility of announcing it; but in case you are called on for information in this regard by the health authorities of other States and municipalities, you will furnish such information to the best of your ability, subject, however, to the approval of the resident member of the National Board of Health. You will furnish the information above directed as to the presence of cases of yellow fever whether you are able to secure the co-operation of the local board or not, and you will understand that this applies to suspicious cases as well as to cases the nature of which is clearly established by diagnosis to be yellow fever. It must be constantly borne in mind that the occurrence of a case, or even of two or three cases, of yellow fever in the city of New Orleans is not in itself a sufficient cause for cessation of commercial intercourse with that place or to cause it to be proper to declare New Orleans to be a "dangerously infected" city; and while it is proposed to keep the health authorities of surrounding States and cities as promptly and fully informed as possible as to the actual sanitary condition of New Orleans as regards the existence of yellow fever there, the National Board desires to use its best influence to prevent any undue restrictions upon the travel or traffic from that city until it becomes evident that dan-

ger would result from their continuance. The action to be taken by the National Board of Health in the event of the occurrence of a case of yellow fever in New Orleans must depend greatly upon the precise point in the city where such case appears, its relations to the commercial portions of the city, its tendency to spread, &c. You will be careful to keep this office fully advised, and, when necessary, by telegraph, of all these facts with relation to the earlier cases, and also as to what steps are being taken to secure isolation, systematic disinfection, &c. In case yellow fever appears in the city of New Orleans during the summer, it is the desire of the National Board to co-operate in every way with the health authorities of the city to restrict the spread of the disease and to stamp it out if possible, and to this end it will be prepared to pay for such services and materials as are necessary for this purpose.

The document referred to as Appendix D was not a production of the National Board of Health, but was prepared by the Medical and Surgical Association of New Orleans, and approved also by the Orleans Parish Medical Society and by the Louisiana State Medical Society. It specifies the several groups of symptoms "*which for sanitary purposes shall be considered to indicate yellow fever,*" and those which "*shall be held to justify (if occurring between May 1 and November 1) a reasonable suspicion of that disease.*" The document in question, thus indorsed by the unanimous voice of the medical profession in and around New Orleans, proceeds to say:

The following cases shall also be deemed suspicious:

Seventh. Any cases respecting which reputable and experienced physicians disagree as to whether the disease is or is not yellow fever.

Eighth. Any case respecting which efforts are made to conceal the existence, full history, and true nature, in violation of section 23, city ordinances of May 13, 1870, and section 22, city ordinances, June 24, 1879.

It is thus apparent that the official reports by Dr. Chaillé of several "suspicious cases" were not only in compliance with his instructions, but were in exact conformity with the principles laid down by the entire medical profession of that city, approved by the general sentiment of that profession the world over, and thus unhesitatingly adopted by the National Board of Health as its rule of action. Let it now be added that while these reports kept the health authorities of surrounding States on the alert, they served also to satisfy these guardians of the public health that there was now no concealment of something worse. The result, in quieting fears and preventing unnecessary restrictions on commerce, was such as ought to have commanded the approbation of all who had the interests of New Orleans at heart.

SCIENTIFIC INVESTIGATIONS FOR SANITARY PURPOSES.

In the annual report of this Board for the year 1882 it is shown that the spirit and the letter of the constituting act, approved March 3, 1879, called for such special scientific investigations as had been carried on under the direction of the Board during the three preceding years.

The National Academy of Sciences having been required by the act creating the National Board of Health to co-operate with said Board in the preparation of its first annual report, addressed also a separate communication to the two Houses of Congress, in which it was recommended that the only limitation which should be placed on these investigations should be the amount of funds appropriated for that purpose, and that the sum to be *annually* allowed for such investigations and sanitary surveys should be \$30,000. The Board, however, never entered upon scientific investigations to the extent thus recommended by the Academy of Sciences. The amount recommended by that body for a single year covered the expenses incurred by the Board in that direction during a period of more than three years. The Board was enabled to ac-

comply so much at so trifling an expenditure of the public funds by reason of the fact that nearly all the eminent scientists who contributed to these investigations did not receive anything for their personal services, the only charges being for the pay of assistants and for the other necessary working expenses of such original investigations.

Of the value in general of such investigations as a means of increasing our knowledge of the causes of disease, and of giving precision and effectiveness to practical measures of prevention, there never has been and there never can be a shadow of doubt among those who are competent to form a judgment in the premises. Of the actual value of the particular investigations set on foot by this Board but one opinion is entertained by practical sanitarians in this country and in Europe. They concur in expressing the most emphatic commendation of most of the papers embodying the results of these investigations, and several have been characterized by the highest living authorities as among the most important contributions ever made to our knowledge of the means of propagation of disease.

As, however, the application of the knowledge thus acquired is not usually immediate and direct, it need not excite surprise that some persons are found to doubt or deny its value. Nay, such persons often attempt to turn such investigations into ridicule until they are silenced by the lessons of actual experience.

The name of Count Rumford is often cited as typifying the successful application of scientific principles to purposes of utility. But it is of this same philosopher, with his characteristic practical tendencies, that Professor Tyndall says:

Rumford and his institution had to bear the brunt of ridicule, and he felt it; but men of ready wit have not abstained from exercising it on societies of greater age and higher claims. Shafts of sarcasm without number have been launched at the Royal Society. It was perfectly natural for persons who had little taste for scientific inquiry, and less knowledge of the methods of nature, to feel amused, if not scandalized, by the apparently insignificant subjects which sometimes occupied the scientific mind. They were not aware that in science the most stupendous phenomena often find their suggestion and interpretation in the most minute, that the smallest laboratory fact is connected by indissoluble ties with the grandest operations of nature.

When M. Pasteur, the celebrated savant of France, who is now engaged in investigating the essential cause of Asiatic cholera, first began his experiments on fermentation, none but those who had some portion of scientific insight would have anticipated their leading to manifold applications of the greatest conceivable utility. For quite apart from their direct practical application in the manufacture of beer and wine, these investigations have ramified into kindred experiments in numerous divergent lines, and have opened up a new world of natural phenomena of the utmost interest and importance. They have disclosed the microscopic germs which produce various infectious diseases, and in some cases they have led to the precious discovery of effectual means of prevention and cure.

The enlightened Government of France, recognizing the practical value of such inquiries, not only afforded to M. Pasteur the means of prosecuting them, but has recently further expressed its appreciation by granting a liberal pension to him and his children.

The National Board of Health aimed to set on foot experimental investigations of such a nature and by such experts in science as would secure results creditable to the nation and useful to all mankind by the discovery of facts which, however insignificant they might at first appear, might eventually lead to the extinction of some of the most fatal diseases and to the consequent lengthening of human life. It selected

for this work men of the highest ability and reputation, nearly all of whom rendered their own personal services gratuitously, and the result in every case has been such as to challenge the respect and admiration of all competent judges.

CO-OPERATION WITH STATE AND LOCAL AUTHORITIES.

Based upon the want of harmony which existed between the Louisiana State board of health and this Board, the causes of which, so far as known, have been explained in a previous part of this report, affirmations have been made that the National Board of Health has failed to operate in conjunction with and to the satisfaction of local boards of health in various parts of the country. Without going into details, it is sufficient to say that the rules and regulations suggested by this Board for adoption by quarantine officers, after a careful study of the methods in use at our various ports, were promptly accepted by the health authorities of nearly every port in the United States, promulgated by them as their own, and are in force even now when the law under which they were drawn up has expired. Health authorities in the interior communicated with the Board on sanitary matters of current interest, furnishing weekly returns of deaths and special reports in the event of the appearance of contagious diseases. Through the medium of this Board a protective system against small-pox was organized, which could have been effected only with much difficulty but for its co-operation and supervision. Public-health associations, medical and sanitary societies, and individual sanitarians watched the work of the Board with a zealous interest, ever ready to support it in its efforts on behalf of the public welfare. While the support of Congress has unfortunately been withdrawn in proportion as time obliterated the memory of the epidemic of 1878, which called the Board into existence, that of the sanitarians of the country, of the health authorities, and of the commercial men of the sections liable to visitations from yellow fever, who know and appreciate the value of the work accomplished, has proportionately increased. Attention is respectfully invited to the mass of evidence which is presented under this heading in Appendix G.

VITAL STATISTICS.

This Board earnestly reiterates its statements in the Annual Report of 1882 with reference to the importance, not merely for sanitary purposes but for manifold reasons, of an accurate collection of vital statistics, and, as a means to this end, of assisting the States to establish a uniform system for the registration of deaths and births as they occur.

EXPENDITURES.

Reference has been made to the fact that during the discussion in the Senate of the bill S. 108, which was subsequently enacted and was approved June 2, 1879, objection was made by a Senator that the amount appropriated under the provisions of the bill was unnecessarily large, and that, in answer to this objection, it was shown by Senator Harris that the full amount would be a small estimate for the various duties that would devolve upon the Board of Health if it should be found necessary in the following year to exercise the powers in the manner and to the extent he had suggested. It has also been stated that the Senate, impressed with the force of this statement, voted down a prop-

osition of Senator Eaton to reduce the amount to \$250,000. No attempt was thereafter made in either branch of Congress to reduce the amount originally specified in the bill, which, added to the sum appropriated under the constituting act, approved March 3, 1879, made an aggregate of \$550,000. An epidemic not quite so widespread nor so fatal as that of the previous year, but still of very large proportions, did actually occur within the year, and called for the precise appliances and measures specified in advance by the distinguished patron of the bill. Nevertheless, as stated by that Senator in an official report made to the Senate in April, to accompany Senate bill 2259—

The expenses of the Board for the first three years of its existence, ending April 3, 1882, aggregate \$506,216.17, or the average of \$168,738.72 per year, the entire expenditures for the three years being about \$44,000 less than the amount appropriated for the first year.

The following table exhibits the annual expenditures of the Board, arranged under several heads:

Statement of the expenditures of the National Board of Health from April 1, 1879, to June 30, 1883.

On what account.	From organi- zation to June 30, 1879.	Year ending June 30, 1880.	Year ending June 30, 1881.	Year ending June 30, 1882.	Year ending June 30, 1883.	
					From appro- priations prior to June 30, 1882.	From appro- priations for the year end- ing June 30, 1883.
Floating quarantine on Mississippi River						
Ship Island station		\$40,238 11	\$38,040 18	\$17,796 42	\$3,782 26	
Sapelo station		18,968 89	34,203 13	12,743 62	2,500 77	
Elizabeth River, Virginia		6,069 48	10,479 31	9,949 92	6,177 83	
Aid to Pensacola, Fla		3,812 16	3,246 54	1,259 89	1,829 08	
Aid to Pascagoula, Miss.		3,005 28	4,444 88			
Aid to Hancock County, Mississippi		3,791 19				
Aid to Harrison County, Mississippi			619 35			
Aid to State board of health of Louisiana			766 90			
Aid to State board of health of Texas			1,901 90			
Aid to Charleston, S. C.		11,384 68	1,275 00			
Havana commission		115 00				
Pay and expenses of inspectors at Havana and other places		38 00				
Special scientific investigations	\$925 69	11,336 87	7,585 32	113 80		
Pay and expenses of members of the National Board of Health		31,459 39	11,204 92	3,011 70	750 04	
Printing of Bulletin of National Board of Health, blanks, &c.	4,044 25	14,496 59	10,192 83	8,715 31	1,826 94	
Pay of secretary, disbursing agent, clerks, messengers, &c.	680 99	12,736 27	8,845 87	5,069 68	1,780 00	
Rent, light, and fuel	1,678 10	6,982 73	9,984 33	9,992 33	756 01	
Telegrams	29 21	18,258 02	18,656 56	17,802 19	1,815 88	
Furniture, stationery, &c., for National Board of Health office	620 89	1,678 24	1,564 43	1,457 59	125 25	
Miscellaneous expenses of the National Board of Health	1,086 03	2,816 78	2,682 53	1,268 79	45 01	
Postage	92 23	4,577 53	2,685 27	1,159 64	12 59	
Report on yellow fever epidemic of 1878.		1,702 20	1,157 43	798 60	137 31	
Hudson County, New Jersey, investigation		1,800 00	260 00	580 23	27 65	
Purchase of tents, furniture, &c., for stations		1,000 00				
Aid to State board of health, Tennessee		9,237 41	485 45			
Aid to State board of health, Illinois		36,232 44				
Aid to State board of health, Mississippi		1,823 82				
Aid to State board of health, Arkansas		7,026 64				
Aid to board of health, Mobile, Ala		6,399 76				
Aid to board of health, Meridian, Miss		2,185 46				
Aid to District of Columbia		218 80				
Immigrant-inspection service		7,710 00				
Inspection of immigrants						
Aid to Pensacola, Fla						
Aid to State and local boards of health						
Rent, light, fuel, stationery, telegrams, and postage					6,177 83	49,947 95
					6,896 85	1,449 67

Statement of the expenditures of the National Board of Health from April 1, 1879, to June 30, 1883—Continued.

On what account.	From organi- zation to June 30, 1879.	Year ending June 30, 1880.	Year ending June 30, 1881.	Year ending June 30, 1882.	Year ending June 30, 1883.	
					From appro- priations prior to June 30, 1883.	From appro- priations for the year end- ing June 30, 1883.
Pay and expenses of members of the Board.....						\$5,915 94
Pay of secretary, disbursing agent, clerks, &c.....						4,942 38
Miscellaneous expenses.....						388 99
Total.....	\$9,146 41	\$266,762 16	\$167,681 95	\$98,523 07	\$34,687 67	62,644 93
						\$897,332 60

NOTE.—Total appropriations for the National Board of Health..... \$767,500 00
 Total expenditures, as per statement..... 639,446 19
 Balance unexpended June 30, 1883..... 128,053 81

The following extract from the last Annual Report of the Board is pertinent in this connection:

It will be observed that the annual expenses for "pay and expenses of members of the Board," on which there was no limitation until the appropriation for the current year, when the sum of \$10,000 was allowed by the sundry civil appropriation bill as finally adopted, have never, except once, exceeded that amount, a fact which is not consistent with either the general charges of extravagance or the specific ascription of mercenary motives to the members of the Board. The single exception occurred during the first year, including the epidemic summer of 1879, when two members of the Board were constantly on duty at the places at which the epidemic prevailed, and two others were for a considerable time in active service in directing measures for the protection of the Mississippi Valley. These expenses might very appropriately have been classed among the special appropriations in aid of the places where the service was rendered; and if they had been so charged the remaining expenses, to be placed under the head of pay and expenses of members of the Board, would not have exceeded the average of other years.

It will also be observed that the largest amount ever expended in one year for special scientific investigations, for which the National Academy of Sciences had recommended that no limit under that of \$30,000 should be assigned, was \$14,496.59.

It will further be observed that for two years in succession a contingent appropriation of \$100,000 was made, to be available in the event of an outbreak of epidemic disease, and that not a cent of it was touched in either year. During both years yellow fever existed at Key West, and it was competent for the Board to open the fund in question for combating the disease at that place and for preventing its transmission to other parts of the United States.

The reasons which induced the Board to abstain from making, by means of the contingent appropriation, the large pecuniary outlay which would have been necessary to establish quarantine inspections and enforce quarantine regulations at Key West have been stated in the Second Annual Report for 1880.

During the fiscal year ending August 7, 1882, small-pox prevailed as an epidemic in various parts of the United States, as has been stated in the preceding pages; and in anticipation of the necessity of using the contingent fund an account was opened with that fund on the books of the Treasury, but by strict economy it was found that the expenses of the immigrant-inspection service could be met during the remainder of the fiscal year out of the general fund, and thus no portion of the contingent appropriation was touched.

ESTIMATES.

It has been shown in the preceding review of the operations of this Board that the quarantine act, approved April 29, 1878, became for the most part a dead letter from the failure of Congress to make any appropriation for its execution. It is to be added that the act in question was expressly repealed by the ninth section of the act approved June 2, 1879, which, assigning to the National Board of Health, then recently established by the constituting act of March 3, 1879, the duty of co-operating with and giving aid to State and municipal boards of health in preventing the introduction of contagious and infectious diseases into the United States, abstained from the assumption of independent authority in regard to framing quarantine regulations. This latter act having now lapsed by its own limitation, and there being no other legislation on the subject except such as was contained in a clause of the sundry civil appropriation act for the current fiscal year, the National Board of Health respectfully but earnestly recommends that appropriate action be taken by Congress, whether by a re-enactment of the expired act under which such beneficent results have been realized, or by suitable amendments to the act of March 3, 1879, as may in its wisdom seem best, to enable the Board to co-operate and aid the local authorities in the execution and enforcement of *their* rules and regulations to prevent the introduction of contagious and infectious diseases into the United States from foreign countries and their spread from one State into others. It is further recommended that an adequate appropriation be allowed for this object.

62 ANNUAL REPORT OF THE NATIONAL BOARD OF HEALTH.

In the mean time the Board respectfully requests that the sum of \$37,700 be appropriated under the existing act, approved March 3, 1879.

SALARIES AND EXPENSES NATIONAL BOARD OF HEALTH.

For pay and expenses of members.....	\$10,000
For disbursing agent, clerks, messengers, &c.....	4,700
To enable the Board to perform the duties required of it by the second section of the act approved March 3, 1879.....	20,000
For rent, light, fuel, stationery, telegrams, and postage	2,500
For incidental expenses	500
	<hr/>
	37,700

All of which is respectfully submitted by—

JAMES L. CABELL,
President National Board of Health.

CHARLES SMART,
Major and Surgeon, U. S. A.,
Secretary National Board of Health.

Hon. C. J. FOLGER,
Secretary of the Treasury.

APPENDED PAPERS.

APPENDIX A.

1. REPORT ON OPERATIONS AT SHIP ISLAND REFUGE STATION, BY DR. T. S. SCALES, SUPERINTENDENT.
2. REPORT OF OPERATIONS AT SAPELO REFUGE STATION, BY DR. W. F. BRUNNER, SUPERINTENDENT.
3. REPORT ON THE ORIGIN OF THE YELLOW-FEVER EPIDEMIC IN PENSACOLA IN 1882, BY DR. WILLIAM MARTIN, ASSISTANT SURGEON, U. S. NAVY, ASSISTED BY DR. R. B. S. HARGIS, OF PENSACOLA.

REPORT OF OPERATIONS AT SHIP ISLAND REFUGE STATION, DR. T. S. SCALES, SUPERINTENDENT.

MOBILE, ALA., October 4, 1883.

DEAR SIR: In accordance with your request that I should furnish a report of the transactions of Ship Island Refuge Station from the date of my last annual report up to June 30, 1883, the following is submitted, with the explanation, however, that its preparation is accomplished under considerable disadvantage in the absence of the station records, which will not be allowed here until the advent of frost in this section.

After preparing and forwarding my annual report for 1882, Ship Island station was at once placed upon its winter basis by dispatching the steamer Day Dream to New Orleans and there leaving her in charge of a watchman, and by the discharge of all employés save a watchman for each of the two principal buildings—hospital and lazaretto—and a captain and two seamen for the sloop Annie. The steamer was sent to New Orleans especially for the reason that some repairs were required on her boiler before she could enter upon another season's commission, and it was considered better to send her at once where said repairs could be done. With the watchman in charge of the steamer at New Orleans, the two watchmen in charge of the buildings on the island, and the captain and two seamen on the sloop Annie, for maintaining communication with the island, the station was conducted until May of the present year, about the first of which month the writer was authorized to proceed to New Orleans and charter a steamer, with the necessary men to man her, and to open Ship Island station for the reception of the infected vessels at the earliest possible day. In consequence of the heavy expense attendant upon the chartering of a steamer, and the uncertainty as to the disposition of the \$100,000 epidemic fund at the disposal of the President of the United States, it was finally decided, for a few weeks at least, to depend upon sail instead of steam; therefore I returned to the station about May 7, and announced that it would be opened for business on the 10th of the month. The sloop Annie was reserved as a boarding vessel, and an arrangement was made with Capt. E. L. James to make three trips per week to the island for the purpose of conveying mails and supplies, at an expense of \$20 per week; this arrangement was continued up to June 30, at which time the station was closed so far as the management of the National Board of Health was concerned. At the time of opening the station in May there were employed, in addition to the *winter force* already mentioned, a cook, a laundress, and a laborer, assigned to duty at the lazaretto, and a cook and a nurse, assigned to duty at the hospital. From the time quarantine was established by the local health boards along the Mississippi coast until the station was closed, on June 30, only three vessels were subjected to quarantine restrictions, as follows: The Spanish bark Rosa y Carmen, from Havana, arrived at the station on the morning of June 16 or 17, having lost a man with yellow fever the day before, whose body was buried at sea and whose bedding and clothing were thrown into the sea at the time of the burial of the body; this vessel was detained in quarantine twelve days without other sickness appearing, was then thoroughly fumigated and disinfected, and discharged from quarantine, after which she took on a cargo of lumber at the Ship Island anchorage. During the detention of this vessel at quarantine no bedding was thrown overboard, nor was there any occasion for throwing such material overboard. The next arrival was the Norwegian bark Alma, from Vera Cruz, sent from the Round Island quar-

antine station by the Jackson County, Mississippi health officials; this vessel arrived on the night of June 27, with two cases of yellow fever on board, one dying and the other convalescent. The dying man expired about 10 a. m. on the 28th, and was immediately brought ashore and interred in the station cemetery. His bedding was at the same time brought ashore and burned by myself on the beach until not a vestige remained. When the order to close the station was received on the 30th of June this vessel was ordered back to the Round Island quarantine station, with the convalescent man lying on his mattress, and with a yellow flag flying at the mast-head as a danger signal, and no bedding was thrown overboard while at Ship Island station. The third and last arrival was the American schooner *Seguin*, from Vera Cruz, without any evidence of infection and without sickness of any kind; this vessel also went to the Round Island quarantine station with a yellow flag flying at the mast-head, and did not throw overboard any bedding while at Ship Island station. It will thus be observed that no vessel this year, infected or non-infected, up to June 30, threw mattresses overboard at the Ship Island refuge station, insinuations of some members of the Louisiana State board of health to the contrary notwithstanding; nor were any infected vessels sent on "roving commissions," as charged by one of the New Orleans dailies. It will be observed in this report that during the period embraced between May 1 and June 30 only one vessel, the *Rosa y Carmen*, was subjected to fumigation, the expense of which was \$16, which amount was collected and deposited with the assistant treasurer of the United States at New Orleans and duplicate receipts taken, the original of which have already been forwarded to you. On June 30, about 7 p. m., the following telegram was received:

"WASHINGTON, D. C., June 30, 1883.

"To Dr. T. S. SCALES,
"Ship Island, via Biloxi:

"Leave one or two men, if need be, as watchmen till other arrangements are made. Send names of men left in charge.

"CABELL."

In reply to this the following was sent:

"BILOXI, Miss., June 30, 1883.

"To Dr. J. L. CABELL,
"President National Board of Health, Washington, D. C.:

"Two men required for buildings. What disposition shall be made of sloop?

"SCALES."

On Tuesday morning, July 3, the following was received:

"WASHINGTON, D. C., July 2, 1883.

"Dr. T. S. SCALES, Biloxi:

"Telegram received. Make best temporary arrangements you can for sloop; employ watchman, if necessary. Report action.

"CABELL,
"Per D."

With the authority and instructions thus give me, and after having seen the two vessels, *Alma* and *Seguin*, on their way to the Round Island quarantine station, each, as stated, with a yellow flag at the mast-head, the two men were left in charge of the buildings and other public property pertaining to the station, and I proceeded to Biloxi on the sloop *Annie*, arriving about midnight of July 3, and there placed the sloop in charge of a watchman. My object was to reach Biloxi in time for the night train for Mobile, as permission had already been granted me by the Mobile board of health to visit that city without restriction; but in this I failed, and the next morning, July 4, the following telegram was received:

"WASHINGTON, D. C., July 3, 1883.

"Dr. T. S. SCALES, Biloxi:

"Transfer all property to officers of Marine Hospital Service, and discharge employees from service of Board.

"CABELL,
"Per D."

On the strength of this order I remained in Biloxi up to 7 p. m. of the 5th of July, without at any time hearing one word from any person representing the Marine Hospital Service, until at the hour and day just mentioned Col. John W. Glenn and Dr. F. Finney, representing said service, were presented to me, and we at once started for the station, arriving about daylight on the morning of July 6. An inventory of the

property was taken and receipted for in detail, which receipt has also been forwarded to you. Being thus formally relieved by Dr. Finney, of the Marine Hospital Service, I proceeded, with Colonel Glenn, to Biloxi, thence to Mobile. From the statements above made, which can be substantiated, if necessary, by abundant evidence, the public can infer how much truth there was in the charge that the officer of the National Board of Health at Ship Island Station abandoned his post before being relieved.

Most respectfully submitted.

T. S. SCALES.

Dr. J. L. CABELL,
President National Board of Health, Washington, D. C.

REPORT OF OPERATIONS AT SAPELO QUARANTINE STATION.

I have the honor to report the following operations at the Sapelo Quarantine Station, Blackbeard Island, coast of Georgia, during my administration as inspector of the station: Receiving my appointment on the 7th day of May from Dr. Charles Smart, secretary National Board of Health, I engaged the following employes: One pilot at \$80, one engineer at \$75, one boatman at \$30, one nurse at \$50, one laborer at \$30, one cook at \$25, and one mail carrier at \$1 per diem when service was rendered. I also made the following estimates: Repairs on steamer, \$25; fuel, \$15; advertising, \$10; rations for six men twenty-one days, \$32.37, and contingencies, \$25. On the 10th of May I advertised the station open and ready for service on the 15th instant, and sent the printed notice to the health officers of all South Atlantic ports. Arriving at the station on the 15th of May, I found the property of station as called for by the inventory given me by Dr. W. H. Elliott, my predecessor. On May 29 I received the Spanish brigantine *Soberano* 3d, from Havana to Fernandina, Fla. This vessel, when off the bar at Fernandina, was hailed and sent to station by the pilots of that port. On examining her bill of health, her hold, and cargo, I found no cause for her detention and sent her to her destination. To June 2 the expense account of the station amounted to \$664.90. Having bought rations only to the 2d of June, and being authorized to purchase rations to June 30, I bought rations for seven men twenty-eight days, amounting to \$44.32.

Before taking charge of the station I had seen how my predecessor, Dr. Elliott, had laid plans for improving the station each year, and I determined to carry out his ideas; but not having the requisite number of men, I could do but little toward carrying out the plans so well laid for the drainage, cleaning up, and general improvement of the station.

The expense account from June 2 to June 30 footed up to \$682.17.

Not hearing from the Board anything in regard to a continuance of the service, I went to Savannah on June 30 to place myself in direct communication with Washington, and received there the information of the Marine Hospital Service having taken the station under their care; returning to the station I turned over the station property to Dr. George Stone, assistant surgeon, Marine Hospital Service.

Respectfully submitted.

W. F. BRUNNER, M. D.

REPORT ON THE YELLOW-FEVER EPIDEMIC OF 1882 AT PENSACOLA, FLORIDA.

BY WILLIAM MARTIN, *Assistant Surgeon, U. S. Navy.*

DR. CH. SMART,
Secretary National Board of Health:

SIR: In compliance with orders received October 17, 1882, from the National Board of Health, I proceeded to Whiting, Ala., on October 18, where I met Dr. J. Cochran, of Mobile, in consultation. Following this, I started for Pensacola, which place I reached on October 19.

On my arrival, I applied for information regarding the earlier cases of yellow fever to all the practicing physicians of the city, to the foreign consuls, to persons interested in the commerce of the port, and to the public generally.

My researches were facilitated by the spirit of cordiality with which the different classes of the population responded to my appeal, and my thanks are especially due to the board of health of Pensacola, to Drs. Hargis, Herron, Bouvier, Renshaw, Fordham, Whiting, White, and Owen, United States Navy, the last named being the sur-

geon in charge of the Pensacola navy-yard. Besides my colleagues of the medical profession, I am indebted to Messrs. C. L. Le Baron, Spanish vice-consul; Howe, British vice-consul; Alexander Grant, Russian vice-consul; Rosasco, Italian vice-consul; and others.

I was taken sick myself on November 1, and as a consequence of my illness and its *sequela*, the duty with which I had been charged, viz, that of reporting on the epidemic, has been delayed in its fulfillment until this late date, which circumstance I deeply regret.

The first point to which it is desired to call attention in the narrative of the epidemic is the history of the Russian bark *Iris*, given below *in extenso*, as per affidavit of her master. This history may, however, be summed up here in the following concise manner. The *Iris* left Havana for Pensacola; during the voyage yellow fever broke out on board. On reaching Pensacola the *Iris* was ordered to Ship Island, where she was disinfected. In due course she was allowed to return to Pensacola, and, after having reached that point, there was a fresh outbreak of yellow fever on board; she was then remanded to Ship Island, where she was again disinfected.

On reaching Pensacola after her first detention at Ship Island, her captain had communicated "man to man" as per language of the master of the *Iris*, with the captain of the *Osmo*, another Russian bark then lying at Pensacola. The *Osmo* had also come from Havana, and there had been sickness of some kind on board. As to the nature of this sickness, I am not prepared at present to express an opinion, but I have applied for information on the subject to Mr. Alexander Grant, Russian vice-consul at Pensacola, who has kindly written to the master of the *Osmo*, which had already sailed for Europe prior to my reaching Pensacola. Mr. Grant promised me all the assistance in his power, and should any result be derived from the correspondence between himself and the master of the *Osmo*, the same will be added to this report in the shape of an appendix. To continue the history of the *Osmo* during her stay in Pensacola, it is important to add that there was at that time a Spanish bark, the *Saleta*, lying at the Pensacola quarantine, together with several other vessels. The *Saleta* had come from Havana and Matanzas, but there had been no sickness on board up to the time of her arrival in Pensacola, except a case of illness which was supposed to be cholera morbus, and which occurred during her passage from Matanzas to Pensacola. The patient recovered. It will be well to remember that the *Saleta* had come from Havana and Matanzas, where she may have contracted the infection, and it should be borne in mind that, although there had been no sickness on board that vessel except the case of supposed cholera morbus mentioned above, prior to July 17 (she had sailed from Matanzas for Pensacola on June 24, 1882), still she had been lying both at Havana and Matanzas, and had shipped two men—the cook and one sailor—at Havana. This cook it was who was taken ill on the voyage between Matanzas and Pensacola, having cholera morbus, as it was supposed, and as it has been stated above. It has been impossible to obtain any information regarding the sailor.

I have been unable, after the most careful investigation, to trace any direct communication between the *Iris* and the *Saleta*. But while the *Saleta* was lying at the quarantine station one of her hands, by name "Jose," went in swimming with some of the crew of the Italian barks *Silvestria* and *Rose d'Aurelia*, which were also there discharging ballast at the "crib." The *Silvestria* came from Cape de Verde Islands, and the *Rose d'Aurelia* from Cape Town.

As far as can be ascertained there was no sickness of any kind on either vessel. It will also be seen that Lopez in his testimony mentions having visited a Nova Scotia vessel, about which he could give no information. The officers and men of vessels lying at the quarantine station were, as it appears, in the habit of going to fish in small boats; they were generally so close to each other as to allow merely room for them to swing clear when at anchor. The three foregoing facts are given so as to state everything which might possibly be construed as having been a source of infection. My belief is that the *Saleta* was not infected by the *Iris*. I consider that in 1882 yellow fever was introduced into Pensacola by the Spanish bark *Saleta*. My reason for this conviction is based upon careful study of the mortality list of the city of Pensacola, from January 1, 1882, down to the arrival of the *Saleta* at the wharf.

It appears from the testimony of both Miguel Brage y Lopez and Francisco Salcido, who deserted from the *Saleta* at Pensacola, that one of the sailors, Carlos y Gartura, was taken sick whilst discharging ballast between July 17 and 20. The ballast was discharged at the quarantine station, distant about 5 miles from Pensacola. He was seized with severe pains in the head, back, and limbs; his eyes were red and watery; he had some fever; he remained in that condition five or six days.

The *Saleta* left quarantine station and arrived at Pensacola on July 22. She was moored at Sullivan's wharf, west side, and at the same time, on the east side of the same wharf, there lay distant about 40 yards an Italian bark; at the same wharf again, but due south of the *Saleta*, was another Italian bark. These Italian vessels were both lying at Sullivan's wharf when the *Saleta* arrived at the same; they subsequently hauled out into the stream on or about July 26. There had been no sick

ness on board these two barks up to the date of the arrival of the Saleta, and none on the shipping in the bay, except that which has been already mentioned as nearly as can be ascertained. Here it may be well to mention that the greater part of the wharves at Pensacola are made of ballast taken from vessels coming from every quarter of the globe. This ballast has been dumped into the bay in order to make the wharves permanent. Some of these extend a considerable distance from the shore, say 300 yards, and they are to day solid ground. Their ends and sides are faced with timber. During the summer months, however, all ballast from infected ports is discharged at quarantine station. The majority of these wharves have been built up in the manner described since the year 1870.

With regard to the statement contained in this letter concerning the breaking out of the fever on board of certain vessels which lay at the same wharf as the Saleta, but subsequent to her departure and the non-appearance of the disease on the ships moored to other wharves or lying at anchor in the bay, I have to report that the railroad wharf differs from the remainder in its construction, and that owing to the decay of portions of the wood work, several large holes have been formed. These I found filled with recent ballast on which was laying old clothing and gunny-bags. These bags came from a guano warehouse built on the same wharf, and, to the best of my knowledge, they had been exposed there since the time the Saleta was tied up to this wharf. I must not omit to say, also, that there was a great quantity of decaying wood on the wharf and in the immediate vicinity. After lying there for some days the Saleta was moved to the east side of the railroad wharf, where she remained until August 15, when she was put to sea. The sick man, Carlos y Gartura, on reaching Sullivan's wharf, was very weak, and continued to be very feeble for several days. It is important to call attention here to the fact that there is a discrepancy between the testimony of the two deserters, Miguel Brage y Lopez and Francisco Salcedo and that of the stevedore Marcellino Yudarte, and also that of Mr. Basterrechea. Basterrechea states that this occurred two or three days after the arrival of the ship at Pensacola; whereas Yudarte testifies that the sailor Gartura was taken ill on July 28, six days after the Saleta had reached Pensacola from the quarantine station; whereas the two deserters swear that Gartura sickened at the quarantine station after commencing to work in discharging ballast. Whatever may be thought of the discrepancy, the fact remains that Gartura was in an enfeebled condition when the Saleta reached Pensacola, and that he was unable to resume his duties for several days. While it is likely that Gartura's case was one of yellow fever, *there is, however, no conclusive evidence to that effect*, and the matter is alluded to here simply with the view of adducing every circumstance which may have had any bearing in the premises. In order to embrace all the facts elicited in the course of this investigation, and to avoid the probability of confusion in the future, another vessel, the British bark Pride of the Ocean, demands attention here. This vessel arrived from Matanzas at the Pensacola quarantine station on June 26; she was in rock ballast and she came to Pensacola on July 17, retaining 100 tons of said ballast for stiffening. Whilst at quarantine one of her crew died of what was reported to be heart disease. After reaching Pensacola, her captain, Henry Barclay, took sick between August 1 and 5, his disease being diagnosed "malarial fever" by attending physician Dr. Frank Renshaw, whose competence as a diagnostician cannot be called into question. The captain was ill eight or nine days; subsequently ~~the~~ case was looked upon as a suspicious one, and by some persons the bark Pride of the Ocean was considered as having been the vehicle for the introduction of the fever into Pensacola. On comparing dates, however, it will be seen that the case of Carlos Gartura, on board the Saleta, reported above, occurred earlier than that on the Pride of the Ocean, Carlos Gartura having sickened between July 17 and 28, which period covers the various dates which have been assigned for the outbreak of his illness by the several parties who have testified in this connection. The fact, however, stands out in bold relief, even if some persons should be inclined to believe that Captain Barclay's illness was *yellow fever*, notwithstanding the diagnosis of his attending physician, that there was sickness on board the Saleta at an earlier date than that when Captain Barclay became ill on board the Pride of the Ocean. It has also been affirmed that two or three men sickened on board the Pride of the Ocean after the illness of the captain. This is an impossibility, however, as nearly all the crew were discharged within a week after her coming over to the city from the quarantine station. Mr. Howe, the British vice-consul at Pensacola, is my authority for stating that the men were discharged as above mentioned.

To return, now, to the history of the Saleta: The next case of sickness occurred on this vessel in the person of Fidel Cariaga (piloto), or the first mate. Here, again, there were different statements as to the date when his illness began. Dr. Herron reports and Eva Smith testifies that he sickened August 3; on the other hand, Dr. Hargis reports and Messrs. Le Baron, Basterrechea, Marcellino, Yudarte, and the two deserters, Lopez and Salcedo, testify that he was taken ill on August 6. Cariaga's case was diagnosed one of *yellow fever* by Drs. Herron and Hargis, and it was the first case so diagnosed.

In connection with his sickness, it may be well to state that 45 tons of ballast had been retained on board for stiffening. This ballast was lying amidships, when the *Saleta* reached Pensacola, and was subsequently moved, on July 28, aft, under the cabin where the officers slept. The mate Cariaga was never seen in the hold by the stevedore, but his duties were such, however, as to render his presence there frequently necessary. During the vessel's stay in Havana, Cariaga went ashore nearly every day, purchased goods, and brought them aboard ship. The officers and crew in coming ashore frequently walked up the railroad wharf to Zarragossa street, down Zarragossa street and past the houses inhabited by the Rossario and Cobb families (of whom mention is made later in this report).

The moving of the ballast and route followed by these parties on leaving this vessel is substantiated; the former by the testimony given by the affidavit of Yudarte, Lopez, Le Baron, and Basterrechea. Cariaga died on the morning of August 10; his corpse was refused burial on shore, and the vessel was ordered to quarantine station, in order that a post-mortem examination might be held, so as to complete the diagnosis of the physician. Instead of proceeding to the quarantine station, the *Saleta* immediately put to sea, carrying with her two of her people who were suffering with yellow fever. One of these men was a sailor who was taken sick either on the 4th or 7th of August, and the cabin boy who sickened on August 8. Both died before the *Saleta* reached Havana, whither she had sailed for the purpose of recruiting her crew. In corroboration of the statement that both these men died, see copy from the Pensacola Commercial, September 8:

"MORE ABOUT THE SALETA.

"The following letter, addressed to Collector J. M. Tarble, was received yesterday morning and handed us for publication. It is pretty much in substance what we published in our Thursday's edition, which was translated from a Spanish journal:

"HAVANA, CUBA, August 30, 1882.

"J. M. TARBLE,

Mayor of Pensacola, Fla.:

"DEAR SIR: The Spanish bark *Saleta* arrived here from Pensacola on the 17th instant. The two young men who were sick when the vessel sailed from your port died on the passage after they had been ill eight or nine days. No other members of the crew have been sick. Of the ten persons composing her crew at Pensacola, three died, viz, the mate before leaving, and the two others who were taken sick before leaving, but who died at sea a very few days before reaching Havana. None of the remaining seven have been sick. I have learned from the captain and remainder of the crew the interesting fact that five of them have had yellow fever in years gone by, and the other two are doubtful. The captain says that one of the two men who died at sea bled from the gums and nose. He does not know anything of their urine; one vomited, but he does not know whether he vomited black. In short, the whole crew are as ignorant as they well can be. The vessel sailed from here yesterday for Bilbao.

"Very truly, yours,

"D. M. BURGESS,

"Sanitary Inspector, National Board of Health."

"And as additional data connected with the origin and history of the fever now in Pensacola, the same gentleman requests the publication of the following:

"It will be recollected that Dr. James S. Herron, on the 14th August, over his own signature, stated to an interviewer his professional opinion that the above three cases were all yellow fever, and that said interview was published in the Commercial of the 15th August as part of Mayor Tarble's card. This was the first published statement of the true nature of the disease on the *Saleta*. Dr. Herron informs us that on the 10th, the day he saw the cases for the second and last time, as the *Saleta* sailed that day, he told Judge Stanley, a member of the board of health, that he considered the case yellow fever, and on the 11th so informed Mr. S. R. Mallory, its attorney. To this opinion Dr. Herron has uniformly adhered."

Before leaving the *Saleta*, it is advisable to state that the vessel laid at the wharf from July 22 to August 10, during which time her officers and crew were ashore every night and visitors aboard every day. Her mate, Cariaga, who died, generally wore a navy-blue coat and vest and cassimere pants. He frequented nightly the Half-way House, a dancing hall and house of prostitution, and several other places of similar character situated on Palafax street wharf. It has also been stated above that two men, Lopez and Salcedo, deserted from the *Saleta* while she was moored at the wharf

in Pensacola. These men secreted their clothing at the corner of Jefferson and Main streets, taking the same route described above. (In giving the names of streets, &c., reference must of course be had to the map, which will be found herewith.)

This clothing remained at the spot indicated for over a week. It should be said that Lopez had yellow fever several years previous, and that neither the stevedore nor any of his employes who worked on board the Saleta contracted yellow fever for a month or two afterwards, and there was no case of fever in the neighborhood where the clothes of the captain and mate of the Saleta had been washed until September 25, with the exception of that of Mr. Gallo, a tailor, the circumstances of which will be given below. In order to prevent confusion I have grouped together in the above history all the cases which occurred on board the Saleta, thus temporarily making no mention of the illness of Captain Bartoro, of the Italian bark Vincenzo Accame.

Captain Bartoro sickened August 6. As to the place at which he was taken ill, there are two different versions. Frank Dool testifies that the captain sickened on board the Italian bark Caranti (lying at Perdido wharf) on Sunday, August 6, between the hours of 11 a. m. and 12 m. I am informed by the Italian consul, however, that Bartoro sickened on board his own vessel that morning. Frank Dool testifies that he saw the captains of the Saleta and Vincenzo Accame together, and on the last occasion when they were thus in each other's company, they both went on board the Saleta, where they supped. This occurred on Friday night, August 4, two days before Bartoro was taken sick. This statement of Dool's is, however, contradicted by the testimony of Messrs. Basterrechea and Le Baron. Dool states further that he frequently saw the captain of the Vincenzo Accame and the mate of the Saleta together, the last time being either Wednesday or Thursday night, August 2 or 3.

Mr. Rosasco, Italian consul at Pensacola, has furnished me with a list of the Italian vessels which were either infected at Pensacola last summer, or became so on the voyage out from that port. In this list, under the head of Vincenzo Accame, it is mentioned that there was personal connection of some kind between the Vincenzo Accame and the Saleta.

Pearl Devenport says that she saw the mate of the Saleta at the Half-Way House, a sailors' dancing hall, a week before his death; he was there in company with other persons, and was complaining of being sick, saying that his head pained him badly.

She also had seen the captain of the Vincenzo Accame with him before that time and once only afterwards. Mr. M. C. Gonzales, a stevedore, also states having seen frequently the captain of the Vincenzo Accame in company with the captain and mate of the Saleta.

With reference now to the case of Captain Bartoro, of the Vincenzo Accame: He sickened on August 6, as I have mentioned above. Dr. Bouvier, his attending physician, states, however, in his report of the yellow-fever epidemic of 1882, that he sickened on August 5, but the doctor was not called upon professionally until August 6. Dr. Hargis was called in consultation on the 11th, and the case was pronounced a doubtful one; still Dr. Hargis suggested the isolation of the patient. There was no autopsy, but Dr. Hargis, immediately after Bartoro's death, issued the following order:

OFFICE OF THE BOARD OF HEALTH,
Pensacola, Fla., August 12, 1882.

SIR: You are hereby directed to proceed at once to the house of Mrs. O'Neal and prescribe that no one enter the room in which the remains of Captain Bartoro, of the bark Vincenzo Accame, lie, and cause to be sprinkled on the floor and about the room Darby's prophylactic fluid. After the corpse is removed for interment the room should be fumigated with burning sulphur for several hours with all openings closed.

All the bedding, clothes, and wearing apparel of the deceased shall be steeped for ten hours in boiling water, wrung out, and dried in the sun. No one allowed to enter the room for forty-eight hours after fumigation.

R. B. S. HARGIS,
President Board of Health.

TO JOSEPH COMMYNS,
Sanitary Inspector.

P. S.—It is recommended that the remains of the deceased should be interred as privately as possible.

The clothes of the nurse should also be put in boiling water.

R. B. S. H.

(See report of Dr. Hargis as to what a member of the board of health said with reference to a private funeral.)

It will be remembered that there is some difference in the statements as to whether he became ill on his own or another vessel. After being sick four days, however, he was brought ashore from the Vincenzo Accame, and was conveyed in a hack to the residence of Mrs. O'Neal, who resided on Intendencia street, between Barcelona and

Tanyard streets. He was accompanied to Mrs. O'Neal's by the mate and members of his crew, and was attended in his illness by Dr. Bouvier, receiving during this time visits from a number of strangers. He died on the 12th. He had a large funeral, at which the participants were mostly foreigners. Mrs. O'Neal states that after the death of Captain Bartoro there was no sickness in her neighborhood until October 1. Angelo Pindela, stevedore, states having been informed that the captain of the Saleta and Vincenzo Accame visited each other at the quarantine station, his informant being the mate of the Vincenzo Accame.

Pindela was one of the party who conveyed Captain Bartoro to Mrs. O'Neal's house on August 10, and he states that the captain's funeral was largely attended by the officers and men of the various Italian vessels in port, viz: The Rosa B., Enrico P., Duc Amice Lichneri, R. I. Aurehà, Alama, Jarnett, Barbarino, Guido, and one or two others. Captain Bartoro was buried in the Catholic cemetery in the northeastern portion of Pensacola. There was no sickness in the neighborhood where Bartoro died. Gustave Neri states having been informed by a sailor from the Vincenzo Accame that the captain of that vessel and the Saleta were together "day after day" whilst at the quarantine station; he also learned that they hunted and fished together; after these two vessels came up to Pensacola he does not know whether the relations of their officers and crew continued to be as close as before, but he heard that the captain of the Vincenzo Accame frequently dined on board the Saleta.

The next two cases after that of Captain Bartoro occurred on the same day, August 9, in the family of John Rossario, on Zaragossa, between Jefferson and Commandencia streets. These cases were developed in the following order: 1st. Dominica Rossario, aged 14 years, 3 months, a native of Italy, in Pensacola for the past six months. She was taken sick at 7 o'clock a. m. whilst engaged in washing two white shirts belonging to Frank Dool, a native of Italy, who was a runner for R. McDavid, a butcher, and he visited daily all the Italian vessels in port, with the exception of the Saleta, which he never boarded, but alongside of which he went frequently at the wharf. He took the clothes of Captain Bartoro from the Vincenzo Accame to have them washed at the Rossario house, where they were laundried by the girl Dominica Rossario, who, as has been stated, sickened at 7 a. m. on August 9. Dominica's father asserts that the clothing was brought to his house about August 1, and that it was returned on the 6th or 7th. Dool says, however, that the clothes were brought ashore and were retained in five days, or about one week before the captain sickened, which event occurred on August 6.

Dool was in the habit of paying daily visits to the Rossario house and to Captain Bartoro at Mrs. O'Neal's residence. The question arises naturally here, was the fever introduced into the Rossario house by the clothing carried thither by Dool, or was Dool himself the vehicle of such transportation? Dool always wore woolen clothing. During Dominica's illness she was visited by several parties, the names of a great many of whom are unknown. She died on Sunday morning, August 13, at 8.30 o'clock. Before burial her body was visited by from forty to fifty persons, whose names I have been unable to ascertain. The funeral was attended by a large number of white persons of all nationalities. The corpse was carried to the Catholic church, situated on Government, between Jefferson and Commandencia streets, immediately in the rear of the Rossario house, which subsequently proved to be the center of the infected district. Drs. Bouvier and Fordham attended the girl Dominica.

Second case.—Lorenza Rossario sickened August 9, at 3 p. m. She was, like her sister, a native of Italy, and had been in Pensacola only six months. She also was attended by Drs. Bouvier and Fordham until August 13. Doctor Hargis was then called in. She recovered about August 25.

The next case was that of Mrs. Josefina Rossario, aged 35 years, a native of Italy, and she also had been in Pensacola for six months only. She sickened on August 11, at about 1 p. m., and was pregnant at the time. Doctor Fordham first attended her, but Doctor Hargis was summoned on August 13; she recovered. During the time that the above-named members of the Rossario family were down with the fever there was a constant stream of Italian visitors from the Dool house to that of the Rossario, and John Rossario, the head of the family, frequently called at Dool's. Dool lived on the beach, or Main street, between Palafox and Baylen. His house was frequented by the sailors from the different Italian vessels in port, and also by Italian residents of Pensacola. The sailors used to eat there, and before sickness occurred in the house they were in the habit of playing cards there for hours at a time. Dool's house contained one sleeping room, 25 feet long by 10 feet wide, and a kitchen 10 by 10. John Rossario testifies that three weeks elapsed after the death of his daughter before his premises were disinfected by the board of health. In the mean while he had himself made some attempt at disinfection, by burning sulphur, parching coffee, and sprinkling lime, &c.

The bedding on which Dominica Rossario died, continued to be used by the family; her clothing, with the exception of that on which she had vomited, was still in possession of her relatives and used by them up to October 27.

I have it on the authority of Dr. Fordham, although the fact appears neither in his report nor in his fabricated statement, that Mr. Gallo, a colored tailor, born in the United States, sickened August 13. Gallo's shop was the next door east of the Rossario house; he resided, however, on the east side of Barcelona, between Zaragossa and Government streets; he recovered.

On August 15 a death was reported at quarantine station, on board the Spanish brig Francisco.

The next case which occurred in the city of Pensacola was that of Mr. Duke, who resided at the northeast corner of Spring and Wright streets; he was aged 21, a native of Florida. He sickened August 16, about 6 a. m. He was a fisherman by occupation, and was employed on a fishing smack, which laid at the same wharf with the Saleta, and for a part of the time immediately alongside of that vessel. He was attended by Dr. Hargis; he recovered.

The next case occurred in the person of an Italian sailor, whose name has been variously reported. Dr. Bouvier describes him as one "Galtano," Gustave Neri as "Salvatore Vincenzo," Frank Dool as Giuseppe Ferri, under which last appellation he was buried. All the above parties are agreed that he lived on his oyster-boat in the bay. He was a sailor, and he had recently been discharged from the Italian vessel Enrico P. He was a native of Italy, about twenty-two years of age. He came ashore every day to take his meals at Frank Dool's house, and it is here that he sickened and was put to bed on Thursday, August 17, at dinner time. He was seen by Dr. Bouvier. He died August 22 (Tuesday). His funeral was public. It does not appear from the testimony that any preventive measures were taken in this instance by the board of health.

The case following was that of Italian seaman Giovanni del Medico, aged thirty-five years. He was living on the beach, or Main street, east of Alcaniz, together with the two brothers Farina. Giovanni del Medico sickened August 17. He and Dool were in the habit of exchanging visits, and he also had been visiting the Rossario family, attending Dominica Rossario's funeral. The above facts with regard to visiting, &c., in this case are not set forth in the testimony, but I have them from Frank Dool himself. He was seen by Drs. Bouvier, Fordham, and Hargis. He recovered.

The next case is that of Emanuel Reta, an Italian, aged fifty years, who lived at Mrs. Harris's boarding house, northeast corner of Wright and Tarragona streets; he sickened August 17. This case was attended by Dr. Bouvier, with Dr. J. C. Whiting in consultation. Dr. Bouvier did not pronounce it to be yellow fever, but he considered it very suspicious. In view of the facts that I have elicited, I have no hesitation in calling it a case of yellow fever. Mr. Reta was the book-keeper of Mr. Piaggio, consignee of the Vincenzo Accame and other vessels. His position as book-keeper necessarily brought him in contact with the captains of these ships.

Gustavo Neri testifies that Reta and the captain of the Vincenzo Accame were constantly together in his store, and that he attended the captain's funeral. Reta died on the 22d August; his funeral was public, the body being conveyed to the Catholic church through the principal streets of the city. There were no sanitary precautions taken by the board of health after Reta's death. I have been unable to trace any connection between this case and others in the neighborhood in which Reta died; in fact, there appears to have been none developed in that locality until some time in October.

It will be remembered that Reta sickened on August 17, that very day the Italian bark Galileo S sailed from Pensacola. It was subsequently reported officially to the Italian vice-consul at Pensacola that she was compelled by sickness on board to put into Hampton Roads, having lost four men from yellow fever at sea. According to the testimony in my possession, the captain of the Galileo S and three of his crew, as well as similar delegations from every Italian vessel in port, attended the funeral of Captain Bartoro of the bark Vincenzo Accame. Now, again, Mr. Frank Dool was in the habit of visiting the Galileo S daily. The next case occurred on August 18, in the person of Ferdinand Marjoni, a native of Italy, aged 29 years. He had been living in Pensacola three or four years. He was an oysterman. Was taken sick on board his boat which was lying opposite Frank Dool's house. For one or two months before his illness he was in the habit of taking his meals and playing cards at Dool's house. He visited the Rossario residence during the prevalence of illness in the family, and attended the funeral of Dominica, whose case has been described above. After being taken ill he was removed from his boat to Dool's house, where he remained for four days. During the course of the disease, he arose from bed and walked about Palafox street wharf about two hours, after which he returned to Dool's. When sick four days he went to the Rossario house, where he remained during the remainder of his illness. Whilst at Dool's he was attended by Dr. Bouvier, and at Rossario's by Dr. Hargis. Notwithstanding the various incidents related above, he did not die.

The next case occurred on August 19, in the person of Salvatore Giardino, a Sicilian, aged thirty years, owner of a sloop, on board of which he sickened. His boat was then lying about 100 feet west of Palafox street wharf, at a point almost directly opposite Dool's house. He spent the time during which he was sick on board of his

vessel and was attended by Dr. Bouvier. He recovered. During his illness he was visited by his brother, who resided on Zaragossa street. His brother sickened a month later. After Salvatore's recovery, he walked about the city in the clothes he had worn during his illness, promenading from Palafox street wharf as far as Romana, a distance of about three squares from the beach. There were no sanitary precautions taken in this instance, and neither were his clothes or his bedding destroyed. He, however, sunk his sloop for three days. Before taking sick he used to visit the Rossario family. After recovery he went up the Choctawhatchee River to a point which I have been unable to ascertain. I have not heard of any case resulting from this voyage.

On the day that Salvatore Giardino took sick, three vessels sailed from Pensacola. These vessels were: The American bark Annie Reed, the Italian barks Rosa B and the Duc Amici Lichuri. The Annie Reed's crew consisted of fourteen men. Some of them were shipped from Tom Glennon's house, situated one door west from Frank Dool's house. Another batch of the crew was shipped from O'Brien's, who lived on Commandentia street wharf. The question may well arise here, Was not the infection carried from Dool's? For, after leaving Pensacola, the Annie Reed was next heard of from the New York quarantine station, where she was reported as having yellow fever on board. When the Rosa B sailed on August 19 her captain, mate, and boatswain complained of being ill. She put back with yellow fever on board, and was ordered to Ship Island, where her captain, mate and two seamen died. It will be remembered that, as I have stated above, when Captain Bartoro of the Vincenzo Accame died, his funeral was attended by a delegation from every Italian vessel in port. Now, the captain of the Rosa B was among those who went to Captain Bartoro's funeral. Frank Dool seems to have played a part here, too; for whilst visiting Captain Bartoro during his illness, he also daily boarded the Rosa B in the discharge of his business duties.

The Duc Amici Lichuri also sailed from Pensacola on August 19. She was compelled to put back, having lost her captain and mate at sea from yellow fever. She was ordered to the quarantine station, where a sailor subsequently died of the yellow fever. The captain of the Duc Amici Lichuri also attended Captain Bartoro's funeral, and Frank Dool was also daily in the habit of visiting his vessel. When I was on my way to Pensacola the remark was made to me that it seemed singular to hear of so many ship *officers* having been seized with yellow fever. May not the answer be found in the fact that the *officers* of all the Italian vessels in port attended the funeral of Captain Bartoro, and that some of these visited him during his illness? The next case occurred on August 21 in the person of Mr. N. S. Cobb, a gun and locksmith. He is supposed to have been the man referred to in the testimony concerning the Saleta who went on board the vessel to make some repairs. I have since ascertained that this supposition is erroneous. His workshop was not in the same building as his residence, which was situated at the corner Tarragona and Zaragossa streets, while his shop was on Commandentia street, three doors from Zaragossa street, and to the southward of the Catholic church. The back yard of the Rossario residence was distant about 51 feet from this shop. In order to state every fact which may have had any bearing, more or less remote, upon this case, it may be well to mention here that the clothes of the captain of the Vincenzo Accame were sent to the Rossarios to be washed, and that they were hung up to dry in this back yard. It is true, however, that two weeks elapsed from the time that these clothes were washed to that when Mr. Cobb sickened. George Clair testifies that there may have been sailors from the Saleta who patronized his establishment, which was a fruit store, located at the corner of Tarragona and Zaragossa streets, and that the steward of the Saleta, with whom he was well acquainted, came to and passed by his establishment daily, frequently purchasing goods for the Saleta. Mrs. Cobb was in the habit of visiting Mrs. Clair at the fruit store every day, her visits sometimes lasting for hours. Mrs. Cobb was also a frequent purchaser at Clair's establishment.

The Clair and Cobb families occupied the same house, which was a two-story double tenement. Here it must be borne in mind that the Saleta had been lying at the foot of Tarragona street. Eleven days had, however, elapsed since the departure of that vessel when Mr. Cobb sickened. A few days before taking sick Mr. Cobb had been kicked in the side by a horse which he was shoeing. He died August 25, between 2 and 3 p. m., after having vomited blood. His corpse was seen by Clair, who testifies that the face and hands (the only parts of the body visible) were "*as yellow as a lemon*." He had no physician until shortly before his death, when he was seen by Dr. Fordham. Mr. Cobb was not buried until 12 m., August 26. His funeral was attended by several persons. Another case occurred on the same day, August 21; the patient was Mary Hobson, aged sixteen years, domestic in the family of Mr. Morino, whose house is situated on Zaragossa, near Adams. The house in which were living some of the Italians whom I have had occasion to mention was distant about 50 yards from Mr. Morino's back yard. Mary Hobson went to the Catholic church the day before her illness, passing on the way the Cobb and Rossario houses. She was also in the habit of purchasing goods at Clair's store. Mr. Jordan, a son-

in-law of Mr. Morino resided, with his father-in-law. His duties as clerk of D. S. Sullivan, consignee of the Saleta, compelled him to make frequent visits to that vessel. Mary Hobson was attended by Dr. Hargis; she recovered. The only sanitary precautions taken with regard to the Morino residence was the generation of ozone. Visitors were prohibited from entering the Morino residence during the illness of Mary Hobson. One young lady, however, Miss Slocomb, succeeded in seeing the patient. Miss Slocomb contracted yellow fever on the 23d August. The next case occurred on August 22 in the person of Vacarezza, the mate and acting captain of the Vincenzo Accame, to which vessel attention has already been called in this report. The mate, whose history I am about to relate, lived on board the ship; he had attended Captain Bartoro during his illness, and was present at the funeral. This mate died on August 25. Dr. Bouvier was his attending physician, and he had also been seen by Drs. Renshaw and Hargis. My investigation led me to believe that Vacarezza did not sicken until August 22, but Dr. Bouvier reports that he was called to see this mate one day earlier, on the 21st, and that Vacarezza complained of being unwell on the 20th, but thought this to be the result of a carousal on shore the night previous. Dr. Bouvier further states that on August 22 he reported on the filthy condition of the Vincenzo Accame to the board of health. Immediately after Vacarezza's death, the bark, with the corpse on board, was dispatched to the quarantine station, where a post-mortem examination was made. This confirmed the diagnosis of yellow fever which had been agreed upon by Drs. Bouvier, Renshaw, and Hargis prior to death. When the Vincenzo Accame was thus ordered to quarantine there were at the time two sailors sick on board. Dr. Bouvier reports learning afterward that both these men had died of yellow fever at Ship Island, to which station the Vincenzo Accame afterward sailed. The Italian vice-consul at Pensacola informed me that this bark lost three seamen of yellow fever at Ship Island instead of two, as reported by Dr. Bouvier. The next case was that of Mrs. Hargis, the wife of Dr. R. B. S. Hargis. Mrs. Hargis was taken ill on the evening of August 22; her husband states that there were no cases of yellow fever in the immediate vicinity of his residence; that his wife had been visiting nowhere, and that on the day when she sickened, he had been visiting patients and inspecting the Vincenzo Accame. He considers that he conveyed the infection to her in his beard and clothing.*

Mrs. Hargis was attended by her husband, and recovered.

The next case was that of Mr. Cater, who sickened August 23; he was eighteen years of age, and resided on the south side of Intendencia street, between the third and fourth block east of Palafox street. This case was personally reported to me by Dr. Frank Renshaw, who attributes the infection to the fact that Cater lived with relatives who were employed as stevedores on board the shipping in the bay, and who frequented the neighborhood where vessels lay in Pensacola. Cater recovered. The next case also occurred on the same day, August 23, when Mrs. H. S. Cobb sickened. It will be remembered that a description has been given above of the case of her husband, Mr. Cobb, from whom the infection was evidently transmitted to her. According to George Clair's statement, Mrs. Cobb died on the 29th August, but according to other accounts, the death took place on the 28th. Mrs. Cobb was visited by Drs. Fordham and Hargis. The day after Mrs. Cobb died, the premises were disinfected by the board of health, and the clothing all burned. Willie and George Cobb, sons of the deceased, and John Sinkler, aged fifteen years, who had been a constant visitor at Clair's house (which, as has been stated, was a two-story double tenement, one half of which was occupied by Clair and the other by the Cobb family), were isolated by order of the board of health and confined in a can factory, situated at the foot of Commandancia street wharf, which is also known as the Ice House Wharf.

Mr. Cobb's brother had in his employ a drayman named Louis Bennel at the time that yellow fever was raging in the Cobb family. This drayman was in the habit of visiting the Cobb house daily. He lived in Mr. Shirmer's house, situated on the south side of Intendencia, between Terragona and Alcaniz streets. In this same house there also lived Mrs. Shirmer and Carl Forbeck, or Faurveck. The above statement is made at this point, as the sickness in the Cobb family will be found further on in this report to have an important bearing in connection with the Shirmer's residence. Mrs. Fannie Calvert Davis spent the whole day with Mrs. Cobb whilst Mr. Cobb's body was exposed. She then went home, where she sickened in the early part of September. As my investigations, however, do not extend beyond August 30 (at which time I felt justified from the evidence collected in considering that the infection was

* I would state here that Mrs. Hargis was in the habit of attending the Catholic church in Pensacola, and there had been yellow fever funerals from this very church; one having taken place on the 13th August, and another on the very day this lady sickened. In speaking of the Catholic church in connection with the Rossario family, I have stated above that subsequent events proved it to be the center of the infected district. The pastor, Father Basson, was a frequent visitor at the residence of Dr. Hargis.

sufficiently diffused throughout the city to create an epidemic), I respectfully submit the following lines from the Pensacola Advance Gazette, September 17, 1882:

"It will be remembered that Mr. and Mrs. Cobb, who were among the first to fall victims to the fever, were visited by Mrs. Davis incidentally, who, as it happened, found them both stricken, and though she knew her situation to be a critical one, yet she remained during the day and administered to their wants, Mr. Cobb dying during the time. On her return home her friends urged the necessity of her remaining close within doors, at least until the incubative period of the disease had passed; and, complying with their wishes, it seems everything, as far as she was concerned, went well until Sunday evening, the 10th instant, she was taken sick. The symptoms not indicating a serious nature, her husband went to his business as usual Monday morning, but in the evening he was summoned to her bedside, there to attend her wants, which continued but a short time, and through a stage of suffering seldom witnessed."

Clair, in his testimony, also mentions the visit of Mrs. Davis to the Cobb house on the day of Mr. Cobb's death. He also testifies that he frequently went to the railroad depot to see about goods consigned to him by express. This circumstance is mentioned owing to the fact, as will be seen, that the express agent, Mr. J. F. McConaughy sickened August 23.

The next case was that of James F. McConaughy, express agent, whose office was situated on Government, between Jefferson and Terragona streets, four or five doors east of the Catholic church, and about one square northeast of the Rossario residence, and a square and a half northwest of the Cobb house. By the very nature of his occupation he was thrown constantly in contact with numbers of people coming from every part of the city. Among these were the draymen and others who hauled fish. McConaughy also passed by the Cobb house every day on his way to bathe in the bay. He sickened August 23, between 3 and 4 p. m., remaining at his office until the next day, when he was removed to Frank Maura's house, on Intendencia, between Palafox and Tarragona streets. On the afternoon of the 23d, whilst complaining of being ill, he walked about the city, thus coming in contact with numbers of persons. He was attended by Drs. Fordham and Hargis. He recovered. During his sickness he was visited by several parties, some of whom subsequently contracted the disease.

Miss Slocumb, who has been mentioned in connection with the case of Mary Hobson above, also sickened August 23. She was attended by Dr. Hargis, and recovered. She lived at the southwest corner of Government street and Seville square.

On the authority of Dr. Bouvier I would state that the boatswain of the British bark Cambay sickened August 23. The Cambay was anchored about 300 yards from the Vincenzo Accame. This is evidently the same man to whom I refer as the second mate of the Cambay in the tabulated statement of cases which will be found lower down in this report.

I have now reached the 24th of August, on which day Mrs. Carroll sickened. She lived on the west side of Alcaniz street, between Government and Intendencia streets, and about half a square from Miss Slocumb's residence. It appears from her statement that a few days prior to her illness she had gone to the express office to see about a package which she received. Father Gardner, who was in the habit of visiting the sick and burying the dead, was a frequent visitor at her house. Dr. Hargis attended Mrs. Carroll, who recovered. Another case occurred on August 24; it was that of Mrs. Sinkler. She lived on the west side of Commandencia between Zaragossa and Government. The Catholic church is one square north of Mrs. Sinkler's residence, which was next door to Mr. Cobb's workshop, the yard of which, as will be remembered, was distant 51 feet from the Rossario house. Her husband and Mr. Cobb worked in the same yard, and she was visited by Mrs. Cobb on August 22. She also states having been visited on that same day by Mr. Cobb, who, at the time, was complaining of feeling ill. Mrs. Sinkler evidently makes an error with regard to the date of the visit paid her by Mrs. Cobb, who, as it has been stated, took sick August 21. It has also been stated that her son, John Sinkler, was in the habit of going to the Cobb house every day, and that he was not isolated at the can factory until some time after August 25. Mrs. Sinkler was attended by Dr. Fordham, and recovered. During her illness she received several visits; her husband sickened September 7 and died on the 10th. On the 11th September she removed to the corner of Alcaniz and Intendencia, where her son John sickened on the evening of the 13th; he died on the 20th. These two last facts, which occurred in the month of September, although for the reasons given above, my investigations were not continued after August 30. The house from which Mrs. Sinkler removed on September 11 was fumigated; finding that she had left her husband's clothing, hats, and boots at her former residence, she returned for these articles, which, however, had been stolen in the meanwhile. There is still another case which originated on the 24th August. The patient was Salvatore Pirale, an Italian, twenty-seven years of age; he lived in Frank Dool's house, or had been there and had nursed Guiseppe Ferri, who died August 22. Pirale and Dool, the day after the death of Ferri, carried the latter's clothes and bedding to Hickey's wharf, where they were sunk in obedience to orders

from the city physician and city marshal. After Pirale was taken sick, Frank Dool took him to a house situated on the beach, or Main street, between Adams and Alcaniz. He died there on August 30.

The next case occurred August 25, on which day Mrs. Duke sickened. She lived at the northeast corner of Spring and Wright streets. Her step son, as I have related above, was at that time convalescent of an attack of yellow fever, with which he had been attacked in the same house. She was attended by Dr. Hargis, and recovered.

Mr. Shirmer also sickened August 25. He lived on the south side of Intendencia, between Terragona and Alcaniz streets. Higher up, in mentioning the illness in the Cobb family, I have stated that a drayman named Louis Bannel, who lived in Mr. Shirmer's house, was in the habit of visiting the Cobb house daily. It has also been reported to me by Dr. Hargis that for several days prior to his illness Shirmer had been intoxicated, and that whilst in this condition he had frequented the wharves. Shirmer died September 3. He was attended by Dr. Hargis.

The next case was that of Juan Farina, who sickened August 26. He was taken ill in the house (on the beach, or Main street, between Adams and Alcaniz), in which Giovanni del Medico had already had the fever, and to which Pirale, suffering from the same disease, had been conveyed two days previously, viz, August 24. He was attended by Drs. Bouvier and Fordham, and recovered.

For verbal report for the next two cases I am indebted to Dr. Frank Renshaw, who stated, however, that although he had attended both, yet he did not know the names of the parties—a mother and her child—who lived on the beach, or Main street, between Palafox and Baylen, one door east of Frank Dool's house. Both sickened August 26. The mother recovered, but the child died August 29. After her recovery the mother removed from the neighborhood and was lost sight of. I have received a verbal report from Dr. Theobald Leonard in relation to the second mate of the British bark Cambay, whom he attended. Dr. Leonard states the invasion of the attack to have occurred on August 26, whilst Dr. Bouvier, who also attended the case, dates the beginning of the sickness from August 23. This has already been alluded to above, as well as the fact that Dr. Bouvier designates the man as the boatswain, instead of calling him the second mate. The vicinity of the Cambay to the Vincenzo Accame has already been referred to, and this fact, as well as the frequent visits to the adjoining wharves amply suffices to account for the origin of this case.

I have already stated that the draymen, Louis Bunnel and Carl Forbeck, both lived at Mr. Shirmer's house. Now, both these men sickened there on the same day, August 27; both died, Bannel on September 3, and Forbeck on September 1. They were both attended by Dr. Hargis.

The next case was that of Mr. Carter, an express agent, who lived at the express office, situated on Government street, between Palafox and Terragona, about four doors from the Catholic church. I have already mentioned that Mr. James T. McConnaughy sickened at the same office.

Mr. Carter visited Mr. McConnaughy after the latter's removal to the Maura residence. Carter sickened August 27; he was attended by Dr. Hargis, and recovered.

Mr. Graham was a grocer and lived next door to the express office, from which he was separated only by a thin wooden partition; his was the next case. His establishment was patronized by the captains of several vessels, whose names he did not know. Messrs. Cobb and Sinkler, who resided in the immediate neighborhood of the store, were among his customers. Mr. Graham sickened August 28, in the morning; he had attended Mr. McConnaughy during his illness, and Carter, who took sick August 27, was Graham's next-door neighbor. Graham died at 5 a. m., on September 2; he was visited by several persons during his illness. He was sick in a room back of the store, the only separation being a thin partition six feet high; the store was kept open till late in the evening of August 28; during the whole of that day the establishment dealt with its patrons as usual. Although the store was closed for general business after that date, still various parties were admitted to make purchases until the night of August 30. Mr. Graham and his partner had been in the habit of visiting the different wharves daily for the purpose of buying and selling goods. All the clothing and bedding in the house was destroyed after Graham's death and the premises were fumigated on three different nights. Dr. Herron was the physician in attendance.

Eight cases occurred on the 28th August. I give below a tabulated statement of cases of yellow fever in Pensacola from August 28 to the close of the epidemic; the statement is copied from the records of the board of health, and I regret having to say that it is very imperfect, as it furnishes neither names, nor ages, nor sex, nor color, nor nationality of those affected with the disease; nor does it make the slightest reference to any who sickened up to August 27, inclusively. In this tabulated statement for August 28 it will be noticed that nine cases of fever are reported, and two additional for August 29. I have been able to trace only eight cases on the 28th, but I can account for the ninth case of the table by stating it to be that of Mrs. Cobb, who sickened August 23 and who died August 28. I have been unable to find the second

case officially mentioned on August 29, and I feel satisfied that they had occurred prior to that date, but that they were only then reported.

The eight cases whose inception I assign to the 28th August are as follows: two-year old child of Mr. Hughes; case reported to me verbally by Dr. Fordham. Mr. Hughes kept an oyster and grocery shop on the north side of Intendencia, between Terragona and Alcaniz streets; he resided on the premises which were on the same block as the house occupied by Mr. Shirmer. This child recovered. The next of the eight cases was that of William Herrz, a seaman residing on the beach, or Main street, between Palafox and Baylen streets, one door west of Frank Dool's. Herrz died September 10, and I received a verbal report of the case from Dr. Fordham, as well as of the succeeding one, which was that of the mate of the British bark Karnak. He had visited the wharves and the shore, his vessel lying in the bay; he recovered. The next case, a seaman from the American bark Penang, which vessel has been lying on the west side of the railroad wharf. The sailor had been suffering with malarial fever for some time prior to taking yellow fever, and in going to the doctor's office, he was compelled to pass through the infected district. He sickened on his vessel. He was then removed to the Marine hospital, situated in the northeastern part of the city. He died September 1.

The next case, on August 28 again, was that of Mrs. Dunbar, who lived on the west side of Alcaniz, between Romana and Intendencia; her husband was working at Overman's mill, directly across the street from the Cobb House, and about one square from that of Rossario. Yellow-fever funerals were constantly passing this neighborhood; there were also cases at the time around the corner on Intendencia, near Alcaniz, which locality was within a square or so of the Shirmer residence. This case was also reported verbally to me by Dr. Fordham. Mrs. Dunbar recovered. The sixth case to be credited on August 28 was that of Mr. W. G. Bush, hospital steward at doctor Fordham's hospital, situated on the west side of Fluor de Blanco street, between Zarragossa and Beach. His business compelled him to pass the Cobb and Rossario houses daily, and he was in constant contact with Dr. Fordham, who was then attending several cases of yellow fever. Bush recovered. Dr. Fordham furnished me with a verbal report of the cases.

Josephine Cherry, whose case was also reported to me verbally by Dr. Fordham, was the seventh case for that day. She lived on the east side of Alcaniz, between Government and Intendencia streets. Miss Carroll, to whom I have already referred, was sick with the fever at that time, and was living obliquely across the way.

The eighth case occurred in the person of an Italian seaman named Farina, whose brother I have reported above as having sickened on August 26. They both lived together in the same house. He was attended by Drs. Bouvier and Fordham. The two brothers Farina, after their recovery from yellow fever, shipped on board the Austrian bark Arno, on which vessel yellow fever made its appearance at a later date.

The next case was that of Joseph Merlin, aged 36 years, a native of France, residing next to the Episcopal church, near the beach. His place of business, however, was situated on Government, between Palafox and Terragona streets, immediately across the way from the express office and diagonally opposite to the Catholic church. With regard to the outbreak of this case some discrepancy exists between the written report of Dr. Bouvier and a verbal statement made by him; in the former it is said that Merlin sickened August 27, while in the latter August 20 was assigned. Merlin had attended the funeral of Rossario's daughter, and he had daily interviews with Mr. Graham and the employés of the express office. He was attended by Dr. Bouvier and recovered.

Julian Gueizillon kept a restaurant on Government street, next door to Merlin's store, and visited the latter on the fourth day of his illness. Gueizillon sickened September 7 and died on the 10th with black vomit.

Joseph Kirson was Merlin's clerk and slept in the rear of the store. He visited Julian during his illness, took the fever on September 8, according to Dr. Bouvier's statement; he died September 11. Merlin also states, without being able to give the dates, that during his illness his son and daughter, aged respectively five and seven years, were sick, the former being ill two or three days and the latter a week. The other members of the family continued in good health. After Merlin's recovery his bed and clothes were burned, as was also everything in the room; this included his clothes, those of his wife, and those of Kirson, deceased, after which the room was fumigated all night and carbolic acid sprinkled about.

The next case is that of a little girl called Charlie Bell Perry, nine years of age. Her father kept a grocery store on Terragona, between Intendencia and Romana streets. She was taken sick between August 28 and 30, and was attended by Dr. R. Hargis. She recovered. Charlie Bell had been visiting the Rossario family, and had seen the corpse of Dominica Rossario, whose funeral she had attended. Although Mr. Perry states that there was no possibility of his daughter having come into contact with any other case of yellow fever, it may be worth mentioning that his store was situated about one square from the Shirmer house, and the store was kept open for genera-

business during the illness of his daughter (Charlie Bell), his wife, and for the two weeks during his illness. Now, it seemed he remembered that before there was any sickness in the Perry family, yellow fever had broken out in the Shirmer house, and it is by no means impossible, although not proven, of course, that the fever may have been transmitted to the Perrys by the Shirmers. Mrs. Perry was taken sick on September 3, and recovered. Mr. Perry sickened on September 10; he also recovered.

The next case was that of a colored man named William Burton, aged nineteen years. He was a carriage driver and was employed by J. R. Roberts, who kept a stable three doors west from Rossario's house. Burton lived in the northeast portion of the city. From the very nature of his occupation he must have been compelled to attend funerals. He sickened August 30 and died September 7.

After tracing out the course of the disease, as above detailed, up to August 30 inclusive, it appeared to me, from the mass of evidence accumulated, unadvisable to pursue my investigations any further, although the Pensacola board of health did not declare the yellow fever epidemic until September 9.

I now append a tabulated statement of all the cases of fever, a report of each of which has been furnished in the preceding pages:

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No.	Date of attack.	Name.	Residence.	Occupation.
1	(*)	Carlos y Gartura.....	Spanish bark Saleta.....	Mariner.....
2	(†)	Fidel Cariaga.....	do.....	Mariner (mate).....
3	(‡)	Seaman (name unknown).....	do.....	Mariner.....
4	Aug. 6	Captain Bartoro.....	Italian bark Vincenzo Accame, August 10, moved on shore to Mrs. O'Neal's, on Intendencia street, Barcelona and Tan-yard streets.	do.....
5	Aug. 8	Boy (name unknown).....	Spanish bark Saleta.....	Cabin boy.....
6	Aug. 9	Dominica Rossario.....	North side of Zaragossa, between Jefferson and Commandancia.	Washerwoman.....
7	Aug. 9	Lorenza Rossario.....	do.....	do.....
8	Aug. 11	Mrs. Rossario.....	do.....	do.....
9	Aug. 11	Mr. Gallo.....	East side Barcelona, between Government and Zaragossa.	Tailor.....
10	Aug. 16	Mr. Duke.....	Fishing smack, then northeast corner Spring and Wright.	Fishermen.....
11	Aug. 17	Giuseppi Ferri.....	His oyster boat, then on south side of Main street or Beach, between Palafox and Baylen. (Frank Dool's.)	Mariner.....
12	Aug. 17	Giovanni Delmedico.....	do.....	do.....
13	Aug. 17	Emanuel Reta.....	Northeast corner Wright and Tarragona streets. (Mrs. Harris.)	Book-keeper.....
14	Aug. 18	Ferdinand Marjoni.....	On his sloop in front of Frank Dool's house, then on Beach or Maine street, between Palafox and Baylen streets.	Mariner.....
15	Aug. 19	Salvator Giardino.....	On his sloop 100 feet west of Palafox, in front of Frank Dool's.	Oysterman.....
16	Aug. 21	Mr. N. S. Cobb.....	Northeast corner Tarragona and Zaragossa streets.	Gun and locksmith.....
17	Aug. 21	Mary Hobson.....	South side Zaragossa, between Adams and Alcaniz.	Domestic.....
18	Aug. 22	Mate Vincenzo Accame.....	Italian bark Vincenzo Accame.....	Mariner.....
	Aug. 22	Two of the crew.....	do.....do.....	Mariners.....
19	Aug. 22	Mrs. Hargis.....	South side of Romana, between Palafox and Tarragona.	
20	Aug. 23	Mr. Cater.....	South side of Intendencia, between Third and Fourth, block east of Palafox street.	
21	Aug. 23	Mrs. N. S. Cobb.....	Northeast corner Tarragona and Zaragossa streets.	
22	Aug. 23	J. F. McConnaughy.....	South side of Government, between Palafox and Tarragona, then at Frank Mauras, on south side Intendencia, between Palafox and Tarragona streets.	Express agent.....
23	Aug. 23	Miss Slocomb.....	Southwest corner Government and Seville square.	
24	Aug. 24	Miss Carroll.....	West side of Alcaniz, between Government and Intendencia.	
25	Aug. 24	Mrs. Sinkler.....	West side of Commandancia street, between Zaragossa and Government streets.	
26	Aug. 24	Salvator Pirale.....	On sloop in front of Frank Dool's; then at Frank Dool's, on Beach or Main street, between Palafox and Baylen.	Mariner.....
27	Aug. 25	Mrs. Duke.....	Northeast corner Spring and Wright.	
28	Aug. 25	Mr. Shirmer.....	South side Intendencia, between Tarragona and Alcaniz.	Shoemaker.....
29	Aug. 26	Juan Farina.....	South side of Main or Beach street, between Adams and Alcaniz.	Mariner.....
30	Aug. 26	Child (name unknown).....	Beach or Main street between Palafox and Baylen, next door to Frank Dool's.	
31	Aug. 26	Mother of above.....	do.....	

* Between July 17 and 28.

† Between August 3 and 6.

‡ Between August 4 and 7.

Nativity.	Age.	Source of infection.	Result.	Attending physician.
	<i>Yrs.</i>			
		Spanish bark Saleta	Recovered	None.
		do	Died August 10...	Drs. Herron and Hargis.
Italy.....		do	Died at sea	Do.
		Associating with mate Fidel Car- iaga of the Saleta, and visiting that vessel.	Died August 12...	Drs. Bouvier and Har- gis.
		Spanish bark Saleta	Died at sea	Drs. Herron and Har- gis.
Italy.....	14	From visits of Frank Dool and washing clothes of Captain Bartoro, of Vincenzo Accame.	Died August 13...	Drs. Bouvier and Ford ham.
do	12	do	Recovered	Drs. Hargis and Ford ham.
do	35	do	do	Dr. Hargis.
United States.....		His shop was next door east of Rossario house.	do	Dr. Fordham.
do	19	His smack lay alongside of the Saleta, and ahead of that vessel Passed the Rossarios.	do	Dr. Hargis.
Italy.....		Visiting the Rossario family, at- tending Dominica's funeral, and from Frank Dool.	Died August 22...	Drs. Bouvier and Ford- ham.
do	35	do	Recovered	Drs. Bouvier, Ford- ham, and Hargis.
do	50	Attended Captain Bartoro's fu- neral.	Died August 22...	Drs. Bouvier and Whit- ing.
do		Visiting the Rossario family, at- tending Dominica's funeral, and from Frank Dool.	Recovered	Drs. Bouvier and Ford- ham.
Sicily		do	do	Do.
United States..	56	His work-shop was 51 feet from the Rossario house; trading with Clair, &c.	Died August 25...	Dr. Fordham.
do	16	Passing Rossario residence, visit- ing the Catholic church.	Recovered	Dr. Hargis.
Italy.....		From Captain Bartoro	Died August 25...	Drs. Bouvier, Hargis, and Renshaw.
do		do	Died (date un- known).	Do.
United States.....		Her husband, Dr. Hargis, in daily contact with yellow fever pa- tients, attending Catholic church.	Recovered	Dr. Hargis.
do	18	Living with relatives who had been working aboard the ship- ping; had been frequenting wharves.	do	Dr. Fordham.
do	40	From her husband	Died August 28...	Drs. Fordham and Har- gis.
do	26	Receiving packages from all parts of the city; passing the Rossa- rio and Cobb houses; place of business but a few doors from Catholic church.	Recovered	Do.
do		Visiting Mary Hobson	do	Dr. Hargis.
do	22	Went to, and received a package from express office; visited daily by clergyman who had buried the dead.	do	Do.
Scotland.....	39	Mrs. Cobb's visit, and proximity to Rossarios.	do	Dr. Fordham.
Italy.....	27	From the Rossario and Dools' re- sidence, where he had been visit- ing.	Died August 30...	Drs. Bouvier, Ford- ham, and Hargis.
Nova Scotia ..	46	From her stepson, Mr. Duke.....	Recovered	Dr. Hargis.
Germany.....		Had been lying around the wharves several days. From Louis Bennel, &c.	Died September 3	Do.
Italy.....	34	Visiting Rossarios and Dool's, &c.	Recovered	Drs. Bouvier and Ford- ham.
do		From Frank Dool's	Died August 29...	Dr. Renshaw.
do		do	Recovered	Do.

No.	Date of attack.	Name.	Residence.	Occupation.
32	Aug. 26	Second mate.....	English bark Camby.....	Mariner
33	Aug. 27	Carl Faurveck or Forbeck..	Shirmer House, on Intendencia, between Tarragona and Alcaniz.	Laborer.....
34	Aug. 27	Louis Bennel.....	do.....	Drayman
35	Aug. 27	Mr. Carter.....	Express office on Government, between Palafox and Tarragona.	Express agent....
36	Aug. 27	J. M. Graham	Next door office on Government, between Palafox and Tarragona.	Grocer.....
37	Aug. 28	Mr. Hughes' baby.....	North side of Intendencia, between Tarragona and Alcaniz.	.....
38	Aug. 28	William Herrz.....	Beach or Main street, between Palafox and Baylen streets.	Mariner
39	Aug. 28	Mate of bark Karnak.....	British bark Karnak, anchored in bay.	do
40	Aug. 28	Seaman of bark Penang....	American bark Penang, west side railroad wharf. Then in Marine hospital, northeast portion of city.	do
41	Aug. 28	Mrs. Dunbar	West side of Alcaniz street, between Romana and Intendencia.	.....
42	Aug. 28	W. G. Bush	Dr. Fordham's hospital, west side Fluor de Blanco, between Zaragossa and Beach.	Steward of Dr. Fordham's hospital.
43	Aug. 28	Josephine Cherry.....	East side of Alcaniz, between Government and Intendencia.	.....
44	Aug. 28	— Farina.....	Beach or Main street, between Adams and Alcaniz.	Mariner
45	Aug. 30	Joseph Merlin	Main street, near Episcopal church; keeps a fruit store opposite express office and Catholic church.	Fruit vender.....
46	Aug. 30	Charlie Bell Perry.....	West side of Tarragona, between Intendencia and Romana, where her father keeps a grocery store.	.....
47	Aug. 30	William Burton	Northeastern portion of city.....	Hack driver

Nativity.	Age.	Source of infection.	Result.	Attending physician.
	<i>Yrs.</i>			
.....		Cambay's proximity to Vincenzo Accame, and his visits to the wharves, &c.	Died August 28...	Dr. T. Leonard.
Germany		From Mr. Shirmer, &c	Died September 1.	Dr. Hargis.
do		From Mr. Shirmer and Mr. Cobb.	Died September 3.	Do.
United States.	23	From J. F. McConnaughy	Recovered	Do.
do	25	do	Died	Dr. Herron.
do	2	Mr. Hughes keeps a grocery and oyster shop. Several cases of fever in that neighborhood.	Recovered	Dr. Fordham.
.....		From Frank Dool's, living next door to him.	Died September 1.	Do.
Novia Scotia..	26	Visits to wharves ashore, &c	Recovered	Do.
Germany		Vessel moored where Saleta laid. Passing Rossario and Cobb houses.	Died September 1.	Drs. White, Hargis, Renshaw, and Herron.
United States.	24	Husband working in Overman's mill, near the Rossario and Cobb houses; funerals passing door daily.	Recovered	Dr. Fordham.
do	27	Contact with Dr. Fordham who was attending fever patients, daily passing Cobb's and Rossario's.	do	Do.
do	10	Miss Carwell was sick obliquely across the way; funerals passing the door.	do	Do.
Italy		From his brother, Juan Farina	do	Drs. Bouvier and Fordham.
France	36	From the express office, Graham's grocery. Went to Rossarios' funeral, &c.	do	Dr. Bouvier.
United States.	9	Several cases of fever in the neighborhood.	do	Dr. Hargis.
do	19	Was driving to funerals; and was employed in a stable threedoors from the Rossario house.	Died September 7.	Dr. Renshaw.

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I append a list of all the cases of fever and deaths, as reported daily to the board of health :

Date.	No. of new cases reported.	Total No. of cases to date.	No. of deaths reported.	Total No. of deaths to date.	Date.	No. of new cases reported.	Total No. of cases to date.	No. of deaths reported.	Total No. of deaths to date.
Aug. 28.....	9	9	1	1	Oct. 12.....	33	1,439	6	128
29.....	2	11	0	1	13.....	46	1,485	5	133
30.....	3	14	1	2	14.....	58	1,543	2	135
31.....	4	18	0	2	15.....	64	1,607	3	138
Sept. 1.....	1	19	2	4	16.....	70	1,677	3	141
2.....	0	19	1	5	17.....	50	1,727	3	144
3.....	0	19	0	5	18.....	56	1,783	3	147
4.....	1	20	2	7	19.....	53	1,836	9	156
5.....	1	21	0	7	20.....	42	1,878	2	158
6.....	0	21	1	8	21.....	49	1,918	3	161
7.....	13	34	0	8	22.....	52	1,970	1	162
8.....	12	46	2	10	23.....	37	2,007	1	163
9.....	16	62	2	12	24.....	51	2,058	5	168
10.....	10	72	2	14	25.....	38	2,096	2	170
11.....	20	92	3	17	26.....	37	2,133	0	170
12.....	22	114	2	19	27.....	33	2,166	1	171
13.....	19	133	3	22	28.....	33	2,199	1	172
14.....	11	144	3	25	29.....	9	2,208	1	173
15.....	19	163	2	27	30.....	19	2,227	1	174
16.....	17	180	1	28	31.....	15	2,242	4	178
17.....	10	190	0	28	Nov. 1.....	11	2,253	0	178
18.....	27	217	1	29	2.....	7	2,260	1	179
19.....	26	243	4	33	3.....	9	2,269	2	181
20.....	41	284	6	39	4.....	10	2,279	2	183
21.....	60	344	2	41	5.....	15	2,294	0	183
22.....	43	387	2	43	6.....	6	2,300	1	184
23.....	36	423	5	48	7.....	7	2,307	1	185
24.....	39	462	4	52	8.....	3	2,310	3	188
25.....	55	517	2	54	9.....	9	2,319	2	190
26.....	60	577	2	56	10.....	3	2,322	0	190
27.....	60	637	6	62	11.....	4	2,326	2	192
28.....	42	679	2	64	12.....	11	2,337	1	193
29.....	52	731	11	75	13.....	1	2,338	0	193
30.....	53	784	3	78	14.....	0	2,338	0	193
Oct. 1.....	45	829	4	82	15.....	0	2,338	0	193
2.....	46	875	5	87	16.....	5	2,343	0	193
3.....	53	930	5	92	17.....	0	2,343	0	193
4.....	56	986	3	95	18.....	5	2,348	0	193
5.....	54	1,040	4	99	19.....	0	2,348	2	195
6.....	71	1,111	4	103	20.....	0	2,348	1	196
7.....	64	1,175	2	105	21.....	0	2,348	1	197
8.....	77	1,252	2	107	22.....	0	2,348	0	197
9.....	48	1,300	5	112	23.....	0	2,348	0	197
10.....	50	1,350	3	115	24.....	0	2,348	0	197
11.....	56	1,406	7	122	25.....	0	2,348	0	197

I also give below a report received from the general hospital at Pensacola, under charge of Dr. J. S. Herron. This report embraces all the cases of yellow fever treated in that hospital; it should be borne in mind, however, that these same cases are included in the list furnished me by the board of health, which has been introduced above.

No.	Name.	Result.	Days in Hospital.	Type.	Remarks.
1	James Hardeman	Death	8	Malignant	Delirium, black vomit, and suppression of urine.
2	A. Loenster	Recovery	10	do	Nausea, purging, and retention of urine.
3	Ed. Miller (colored)	Death	9	do	Hemorrhagic.
4	Wilson	do	6	Virulent	Hemorrhage, black vomit, and suppression of urine.
5	C. Giacomo	do	2	do	Black vomit and sudden collapse.
6	D. Adolfe	do	8	do	Hemorrhage, black vomit, and convulsions.
7	E. Yarbhour (colored)	Recovery	6	Mild	Hiccoughs and retention of urine.
8	P. Tomeque	do	7	Virulent	Hemorrhage, black vomit, and suppression of urine.
9	L. Giovani	Death	5	Virulent	Suppression of urine and black vomit.
10	M. Domonica	do	6	do	Black vomit, and perfectly unmanageable.
11	E. Gambella	Recovery	10	do	Suppression of urine.
12	L. Miller (colored)	do	11	Malignant	Hiccoughs, purging, and retention of urine.
13	Jake Burr	do	10	do	Black vomit, hemorrhage, and delirium.
14	T. Spencer	Death	5	Virulent	Hiccoughs and nausea.
15	N. Viciano	Recovery	7	Malignant	Hiccoughs and retention of urine.
16	N. Kelly (colored)	do	9	Mild	Hiccoughs and nausea.
17	J. McLain (colored)	do	7	do	Hiccoughs, nausea, and retention of urine.
18	E. Lunden	do	10	Malignant	Hiccoughs, nausea, and retention of urine.
19	M. Weaver (colored)	do	7	Mild	Hiccoughs, nausea, and retention of urine.
20	Susan Bailey	do	11	do	Purging, nausea, and retention of urine.
21	H. Simmons (colored)	do	7	do	Deserted.
22	A. Bowers	do	12	Malignant	Do.
23	A. Bushing	do	7	Mild	Hemorrhagic and prostration.
24	A. Walker (colored)	do	2	do	Delirium, nausea, hiccoughs, and suppression of urine.
25	T. McCormack	do	1	do	Black vomit, delirium, and suppression of urine.
26	James Kelly	Death	7	Virulent	Purging, nausea, and suppression of urine.
27	Jac. Jones	do	5	Mild	Hemorrhagic and prostration.
28	George Peters	Recovery	6	do	Delirium, nausea, hiccoughs, and suppression of urine.
29	R. Balbernie	Death	9	Virulent	Black vomit, delirium, and suppression of urine.
30	W. Dickenson	Recovery	7	Mild	Purging, nausea, and suppression of urine.
31	John Racey	do	10	do	Acute headache, nausea, and hiccoughs.
32	George Pfeiffer	Death	5	Malignant	Hemorrhagic and delirium.
33	B. Sellars (colored)	Recovery	10	do	Purging, nausea, and suppression of urine.
34	Nat. Good	Death	5	do	Acute headache, nausea, and hiccoughs.
35	W. H. Bush	Recovery	2	Mild	Hemorrhagic and delirium.
36	M. Sorrel (colored)	do	5	do	Overwork and encephalitis; collapse.
37	A. Martell	do	9	do	Suppression of urine and sudden collapse.
38	Mary Creedon	Death	4	Malignant	Purging and vomiting.
39	Leon Stern	Recovery	5	Mild	Delirium, nausea, and retention of urine.
40	W. H. Glenn (colored)	Death	7	Malignant	Wildly delirious.
41	Gus. Meyers	Recovery	11	Mild	
42	A. Staples	do	10	do	
43	J. Campbell	do	10	do	
44	M. O'Donnell	do	5	Malignant	
45	Jef. Adams (colored)	do	4	Mild	
46	Molly Thomas	do	9	Malignant	
47	J. Svanen	do	10	Mild	
48	J. Jacobson	do	9	Malignant	

No.	Name.	Result.	Days in Hospital.	Type.	Remarks.
49	E. Givelson	Recovered	9	Mild	Convalescent; fright, relapse, and collapse.
50	G. F. Lowman	Death	8	Malignant	
51	W. Garnet (colored)	Recovery	2	Mild	
52	H. Bowers (colored)	do	7	do	
53	R. Holman	do	20	Virulent	Nausea, typhoid, delirium.
54	Sidney Herbert	Recovered	7	Malignant	Nausea and prostration.
55	William Budd	do	10	Mild	
56	Gus Angren	do	3	do	
57	S. Walton	do	8	do	
58	Unknown (Italian)	Died	1	Virulent	Admitted in dying condition.
59	Ol. Olson	Recovered	6	Mild	
60	M. Hill (colored)	do	10	Malignant	Nausea and continued acute headache.
61	Charles Farres	do	6	Mild	
62	James Murphy	Died	2	Malignant	Delirium and collapse (hard drinker).
63	W. Wilcock	do	4	Virulent	Black vomit, suppression of urine.
64	O. Olsen	Recovered	15	Malignant	Prostration.
65	W. Stephenson	Died	5	do	Hemorrhagic and suppression of urine.
66	M. I. Marley	do	4	do	Prostration and congestive chill.
67	Sim. Boardman	Recovered	6	Mild	
68	I. Youngblood	do	7	do	
69	H. Alexander (colored)	do	12	Malignant	Prostration.
70	Tom Smith	do	10	Mild	
71	F. Jackson	do	9	Malignant	Hiccough and retention of urine.
72	T. MacHall (colored)	do	6	do	Hemorrhagic.
73	George Wilson	do	7	do	Purging and nausea.
74	A. Duncan (colored)	do	8	do	Nausea and retention of urine.
75	Con Steward	Died	7	do	Hemorrhagic, blooconga, delirium, and suppression of urine.
76	T. Patterson (colored)	Recovered	5	Mild	
77	Unknown (Italian)	Died	11	Virulent	Admitted in dying condition.
78	F. Offney	Recovered	10	Malignant	Prostration.
79	R. Seales (colored)	do	10	Virulent	Black vomit, prostration, and retention of urine.
80	W. H. Slater (colored)	do	7	Malignant	Nausea and retention of urine.
81	Chris. LeClare	Died	12	do	Suppression of urine and sudden collapse.
82	George Bunde	do	6	Virulent	Pituitful hemorrhage from the bowels.
83	M. Hall	do	8	Mild	Relapse.
84	M. Silve	Recovered	8	do	
85	H. Hopkins	do	8	do	Hiccoughs and suppression of urine.
86	I. Ford	do	6	do	Hemorrhagic.
87	G. F. Watson	do	4	Mild	
88	George Adrosio	do	7	do	
89	Nich. Kivas	do	7	Malignant	Nausea and delirium.
90	W. McMakin	do	10	do	Purging and hemorrhagic.
91	T. Jackson	do	4	Mild	
92	Fred. Wright	do	6	do	

GENERAL HOSPITAL, PENSACOLA, FLA.,
November 15, 1892.

JOE FENWICK,
Hospital Steward.

General hospital, Pensacola, 1882.

Total number of yellow-fever cases treated	90
Total number of deaths	22
Total number recovered	68
<hr/>	
Virulent	18
Malignant	35
Mild	37

Two cases were admitted to hospital in a dying condition. Four on the fourth, one on the fifth, and one on the sixth day of the attack. Two recovered after black vomit and one after arrangements had been perfected for his funeral. Forty-three have been in Pensacola under three months; twenty-five under six months; eleven under twelve months; eleven from one to nine years.

OCCUPATION.

Laborer	21	Cabinet-maker	1
Seaman	27	Gardener	1
Housemaid	3	Mechanic	2
Cabin-boy	3	Barkeeper	4
Steward	2	Peddler	1
Cook	6	Prostitute	1
Groom	1	Waiter	4
Painter	2	Gambler	2
Carpenter	4	Tailor	2
Clerk	3		

NATIVITY.

Austria	4	Italy	10
Canada	4	Greece	6
Denmark	2	Germany	10
Great Britain	12	Norway and Sweden	6
United States	34	Finland	2

JOE FENWICK,
Hospital Steward.

I have procured from Mr. William McKenzie Oerting, deputy harbor master at Pensacola, a statement and plan showing the location of certain vessels in Pensacola Harbor during the months of July and August, and introduce the same below.

PENSACOLA, November 10, 1882.

DEAR SIR: Your communication of the 5th instant at hand, and, at your request, in regard to the situation, &c., of certain vessels, during the months of July, August, and September especially, I have the honor to make the following statements:

The Italian bark Vincenzo Accame arrived at quarantine station June 25 from Port Elizabeth, Algoa Bay, south or southeast coast of Africa, discharged ballast at the new crib, and arrived at Pensacola July 7, and moored abreast, or nearly so, of Palafox street wharf, about 400 yards from wharf. On August 12 the captain, who had been sick several days and been removed to a place on shore, died; and the mate, who was then taken sick, died a few days later, when the vessel was sent across the bay as near to the quarantine station as practicable, and sent to Ship Island next day, where most of the crew died.

Italian bark Rosa B. arrived from Baltimore direct on July 21; called at quarantine station, received pratique, came over to town same day, and was taken to the Pensacola and Louisville Railroad wharf to discharge ballast; remained there ten or twelve days, and then went into the stream and moored about 100 or 150 yards from the Vincenzo Accame; went to sea August 21, returned to the bar on the third day with mate, boatswain, and cook sick, and was taken by towboat Juno to Ship Island, where the captain and several of the men died with yellow fever.

Spanish bark Saleta arrived at quarantine station July 2 from Matanzas; discharged ballast at new crib, was fumigated and whitewashed in lower hold, and came to town July 22 and taken to Mr. Sullivan's wharf; remained there four or five days, and then hauled across to Pensacola and Louisville Railroad wharf, east side, opposite the bark Rosa B.—the wharf about 50 yards wide. Went to sea August 16, after death of the mate.

American bark *Penang*, from New Orleans, arrived at quarantine station August 15; received pratique, and was taken alongside the Pensacola and Louisville Railroad wharf to discharge ballast, she taking the same berth previously occupied by the *Rosa B.* One man was taken sick next day; was sent to Marine Hospital, where he finally died from yellow fever.

British ship *Pride of the Ocean*, from Matanzas, arrived at quarantine station June 26, released July 17, and taken to her loading berth in the bay. Captain Barclay and one or two men sick while in port, but all recovered. Went to sea August 22.

Italian bark *Due Amice* Ligure arrived from Buenos Ayres July 23; released from quarantine August 1; went to sea August 19; was at sea ten or twelve days, when the captain and mate died. Vessel returned to quarantine station after being at sea about twenty days. While at quarantine, where she still remains, had several of the crew sick and two deaths.

Italian bark *Galileo*, from Cape de Verde Islands, arrived at quarantine station July 21; released August 1; loaded in bay abreast railroad wharf, and went to sea August 17; had no one sick while in port, but put into a Northern port about three weeks later, with part of crew sick, four having died on the passage.

British bark *Cambay*, from Kingston, Jamaica, arrived July 28, released August 11, and came to her loading berth; was sent across the bay August 27 with second mate sick, who died next day, and the ship went to sea a few days later.

British bark *Laura Emely* arrived from Bahia July 21; released August 8; lost mate and one man while in port; cleared for sea September 21, but did not sail for several days after, the new captain being on shore sick with fever, but recovered.

British bark *Karnak* arrived July 23 from Rio Janeiro; released from quarantine August 24. While in port had captain and mate sick. Both recovered, but lost one man with yellow fever, who died at the hospital.

Italian bark *Catarina Accame* arrived from Tarragona, Spain, August 19; discharged ballast at Dr. Herron's old wharf; took in part of cargo there, and went into stream September 9; while at wharf the captain was taken sick, but recovered; after being in stream for some days several of the crew sickened and died. Remains in port, being partly destroyed by fire.

Italian bark *Catarina*, from Cape de Verde Islands, arrived at quarantine August 23; released September 12; while loading in the bay had nearly the whole crew sick, including the captain, who died, as well as several of the men; vessel went to sea.

Austrian bark *Arno* arrived at quarantine station September 7 from Jamaica; released September 15; a few days after arrived at loading berth in bay Captain Ragusin took sick of yellow fever and died; vessel ordered to Ship Island by agent for precautionary measures.

British bark *Wave King* from Rio Janeiro, via St. Thomas, arrived at quarantine September 7; released September 26, and taken to the Pensacola and Louisville Railroad wharf, where she took in cargo. While loading had six men sick with yellow fever, and all convalesced. Went to sea October 25 and returned November 1, with captain and one man sick, one death having occurred while at sea, and the other sick man died on November 4. Vessel still in port. In regard to goods being landed from any of these vessels, I am not aware of any, except clothing, &c., belonging to sailors who left or deserted their respective vessels and were taken on shore at different times. The crews, especially of the Italian vessels in port, from captain to cook, had constant communication with one another, both ashore and on board.

I wish to call your attention to the singular fact that, with the exception of the bark *Catarina*, no sickness occurred on any of the vessels while loading in the bay when ballast was discharged at the old crib, but invariably on vessels which had discharged ballast at the new crib, where all vessels from Havana and other West India and southern ports discharged their ballast. The *Wave King* also discharged ballast at the old crib, but no doubt contracted the fever here, being moored at the railroad wharf, and her crew visiting the city every night. She occupied berth just ahead of where the *Rosa B.* discharged ballast.

With the history of the bark *Iris* you are no doubt a great deal better acquainted than I am. I can, however, state that the only vessel in close proximity to that vessel when she returned from Ship Island July 19, was the Austrian bark *Guisto*, and then only for a day or so, and which vessel had no sickness on board whatever. I add a diagram of the wharves and loading-ground in the bay, with the situation of the different vessels mentioned in this report.

I am yours respectfully,

WM. MCKENZIE OERTING,
Assistant Harbor-Master.

Dr. R. B. S. HARGIS,
President Board of Health.

Sullivan's Wharf.

Railroad Wharf.

Ice House Wharf.

Mr. Wittich's Wharf.

Palafox Street Wharf.

Mr. Merritt's Wharf.

Dr. Herron's Wharf.

Mr. D. Burns's Wharf.

Perdido Wharf.

Saleta.

Saleta.

Rosa B. Wave King.
Penang.



Island.

○ Galileo.

○ Fr. Jarnet.

○ Karnak.

○ Enrico P.

○ Rosa B.

○ L. Emily.

○ V. Accame.

○ Caronte.

○ Gusto.

○ Rosa Aurelia.

○ Anne Goudy.

○ Salvatore.

○ C. Accame.

○ Catarina.

○ Stadacona.

○ Due Amice Legure.

○ Gambay.

Pride of the Ocean.

I also deem it advisable to insert here a complete list of all the vessels infected by yellow fever this season at Pensacola. The fever made its appearance on these vessels either in the port of Pensacola or during the outward voyage.

Nationality.	Class.	Names of vessel.	Where from.	Date of arrival at—		Remarks.
				Pensacola quarantine.	Pensacola City.	
Russian.....	Bark.....	Iris.....	Havana.....	June 28.....		Yellow fever on voyage from Havana; ordered to Ship Island June 28.
Do.....	Bark.....	do.....	Ship Island.....	July 19.....		Remanded to Ship Island July 22, yellow fever appearing July 20 at Pensacola quarantine.
Do.....	Bark.....	do.....	do.....	August 28.....	September 21.....	Yellow fever in latter part of July either at quarantine or Pensacola wharves, 3 cases between August 3 and 10; 1 man dying in port; 2 at sea August 10; ordered to quarantine, instead of which she put at sea.
Spanish.....	Bark.....	Saleta.....	Matanzas.....	July 2.....	July 22.....	One man reported by quarantine physician as having died of yellow fever August 15; ordered to Ship Island quarantine. Did not return to Pensacola.
Do.....	Brig.....	Francisco.....	do.....	July 26.....		Captain sickened August 5, died August 12; mate sickened August 21, died August 25, on which day she was ordered to Ship Island quarantine, where 3 seamen died. Did not return to Pensacola.
Italian.....	Bark.....	Vincenzo Accame.....	Port Elizabeth.....	June 25.....	July 27.....	Sailed from Pensacola August 17; lost 4 men at sea with yellow fever; put into Hampton Roads.
Do.....	Bark.....	Galileo S.....	St. Vincent.....	July 21.....	August 1.....	Sailed from Pensacola August 19, captain, mate, and boatswain feeling ill on day of sailing; returned to Pensacola; ordered to Ship Island, where she lost 4 men.
Do.....	Bark.....	Rosa B.....	do.....			Sailed from Pensacola August 19; put back with yellow fever aboard; lost 2 at sea and 1 at Pensacola quarantine.
Do.....	Bark.....	Due Amigi Liguri.....	Buenos Ayres.....	July 23.....	August 1.....	Boatswain died at Pensacola.
Do.....	Bark.....	Solcite.....	St. Vincent.....	August 22.....	September 6.....	Lost 4 seamen in Pensacola.
Do.....	Bark.....	Catherina Accame.....	Tarragona.....	August 19.....	August 20.....	Lost captain and 3 seamen in Pensacola; sailed November 2; put into Havana with captain and cook dead.
Do.....	Bark.....	Catherina.....	St. Vincent.....	August 23.....	September 12.....	Lost captain and 1 boy in Pensacola.
Do.....	Bark.....	Agostino Giuseppe.....	do.....			Lost 1 man.
Do.....	Bark.....	Ellena.....	Hull.....	October 30.....	October 30.....	Sailed from Pensacola August 19; put into New York with several cases aboard.
American.....	Bark.....	Annie Reed.....	Cienfuegos.....	June 25.....	July 15.....	One man sent to hospital August 25.
Do.....	Bark.....	Penang.....	New Orleans.....	August 15.....	August 15.....	One man sent to hospital October 2.
Do.....	Schooner.....	A. Heskon.....	New York.....	September 1.....	September 1.....	One man sent to hospital October 19; October 29, 1 man treated on board.
Do.....	Bark.....	Carrie E. Long.....	do.....			One man sent to hospital November 11.
Do.....	Bark.....	Crusader.....	do.....			Sailed from Pensacola October 6; lost second mate October 12 at sea. Several cases in Havana.
Do.....	Brig.....	W. J. Phillips.....	Port Rico.....	August 8.....	August 28.....	Ordered to quarantine August 28; 1 man died August 28.
British.....	Bark.....	Cambay.....	Jamaica.....	July 22.....	August 11.....	

Do.....	Bark.....	Karuak	Rio de Janeiro	July 23	August 24	One man died in hospital September 19; captain and mate sick aboard previously.
Do.....	Bark.....	Rhode.....	do.....	August 11.....	August 29	One man set to hospital October 6. Vessel afterwards capsize in Bay.
Do.....	Bark.....	Wave King.....	do.....	September 7..	September 25.	Several cases aboard, besides 3 men sent to hospital sailed from Pensacola October 24; after being out several days returned with yellow fever aboard.
Do.....	Bark.....	Laura Emily	Bahia.....	July 21	August 8	One man died aboard of yellow fever September 11; 2 men sent to hospital September 23, one of whom died.
Norwegian	Bark.....	Pimsoll	London.....	September 3..	September 3..	This vessel was ready for sea September 23, when 1 man sickened and was sent to hospital.
Do	Bark.....	Emma	Amsterdam.....	October 9	October.....	One man died on November 15 and 2 on November 19.
Swedish	Ship.....	do.....	Hull.....	October 30	October 30	One man died on shore and 1 on board.
Austrian.....	Bark.....	Arno	Jamaica	September 7..	September 15.	Had yellow fever in port, some of whom died.

NOTE.—All the cases of sickness, as well as the deaths reported in the above list, are from yellow fever.

Suspicion having been directed to the three following-named vessels, the Spanish steamship *Frederico*, the Spanish steamship *Murciano*, and the Italian bark *Adele Accame*, which latter vessel was stated to have put into Tybee, Ga., with yellow fever on board, in the early part of August, I would state that Dr. MacFarlane, the health officer, writes me that the only case of sickness on board that vessel occurred in the person of the captain, who was suffering from initiative fever produced by a fistula. He being the only one who understood how to navigate the bark, she was compelled to run into Tybee for assistance.

The *Frederico* came from Matanzas, reaching Pensacola quarantine on May 18 and being released on June 1. Her ballast was discharged at Sullivan's wharf. While this course was certainly very reprehensible, still, so long a time elapsed from the date of the discharge of the ballast until that of the appearance of the fever in Pensacola, that in all fairness it must be admitted no connection can be established between these two facts.

The *Murciano* arrived at the Pensacola quarantine from Cienfuegos on May 29, and was released July 10. She had clean sand ballast taken from the beach at Cienfuegos, but was refused permission to discharge it at Pensacola City, and was therefore compelled to cross the bar and unload this ballast into the sea.

The history of the three above-named vessels is given simply with the view of setting at rest any controversy which might arise on the subject.

In order to enable the reader to obtain, as it were, a bird's-eye view of the spread of the epidemic of 1882 in Pensacola, the accompanying map is given. On this chart will be found the location of the several cases of yellow fever, numbered according to the order in which they occurred.

Several physicians in Pensacola have furnished me with tabulated statements of their cases during the recent epidemic, and I refer to these which will be found lower down.

I have procured a list of the shipping reporting at the Pensacola quarantine station from May 15 to November 4, 1882, and a custom-house report of vessels arriving from infected ports.

PENSACOLA, FLA., November 24, 1882.

DEAR DOCTOR: In reply to your communication, I have to state that the first case of yellow fever which came under my observation was that of an American seaman, William Herry, of the bark *Penang*. He was admitted to hospital on the 25th of August, late in the afternoon. The next morning I regarded this as a suspicious case and isolated this from the other patients; and, on the 27th instant, making a complete diagnosis, became satisfied that it was yellow fever. This was the first case officially recognized by the Board of Health on shore at this port and bulletined at their office.

Taking it, that you wish from me only "ship cases," I omit mention of cases in my private practice ashore; and submit the following report of cases subsequently treated by me in the Marine Hospital, viz:

1. Elan Harroldson. Admitted October 5. Yellow fever. Discharged October 16. Seaman of the sloop *Gipsy* belonging to this port.
2. O. Olsen. Admitted October 9. Yellow fever. Discharged October 17. Seaman belonging to the American schooner *A. Heaton*.
3. Stephen Turner. Admitted October 19. Yellow fever. Discharged October 29. Seaman belonging to American bark *Carrie E. Long*. On this vessel there was another case, treated on board, and recovered.
4. John Peters. Admitted November 8. Yellow fever. Died November 11. This was one of the most malignant cases that I saw during the season. This man was a seaman on board of the American bark *Crusader*.
5. In my private practice amongst the shipping of this port, I treated nine seamen of the British bark *Wave King*, six on board and three in hospital, the first on the 4th day of October; and all these cases recovered.

Trusting that these facts may assist you in the promotion of the ends which you have in view,

Very respectfully, &c.,
WM. MARTIN, M. D.,

Assistant Surgeon United States Navy, City.

R. C. WHITE, M. D.

Shipping list.—From Lloyd's agent and Spanish consulate at Pensacola, November 1, 1882.

ARRIVALS AT CITY OF PENSACOLA.

Spanish steamship *Frederico*, 1454 tons, J. A. Larrauri, master, June 2, 1882, from Matanzas, in ballast. Part of this ship's ballast was landed on one of the wharves. She had a crew of 40 in all. I did not hear of any sickness on this vessel.

Spanish steamship *Murciano*, 1552 tons, E. Luzarria, master, June 12, 1882, from Cienfuegos, in ballast. Had a crew of 37 in all. This is the vessel that had clean

sand ballast, taken from the beach where the tide covered it regularly. She put out part of this ballast in a lighter at quarantine; the lighter was sent from Pensacola and returned to Pensacola; it is the property of George W. Wright. The remainder of her ballast, about 180 tons, was taken outside the bar and thrown in the Gulf. The ballast kept in was kept for stiffing, and while the stevedores, about 20, were handling the lumber and putting it in for stiffing, the crew were handling the ballast. I did not hear of any sickness on this vessel. Consigned to H. Baars and loaded by Captain Pettison, stevedore.

Spanish bark *Fermina*, 232 tons, José Menendez, master, June 21, 1882, from Havana, in ballast. This vessel had a crew of 10 in all. I did not hear of any sickness on board of her. Consigned to G. W. Robinson.

Spanish schooner *Sofia*, 320 tons, *Slorca*, master, July 1, 1882, from Havana via Key West, in ballast. She had a crew of 9 in all. I did not hear of any sickness on this vessel. Consigned to G. W. Robinson.

Spanish bark *Saleta*, 336 tons, G. Menchaca, master, July 22, 1882, entered at consulate July 24, from Matanzas, in ballast. On arrival this vessel had a crew of 12 in all; when she sailed, had 9 in all. Two men deserted; the desertion, according to my records, was reported August 8, 1882, in the morning. On Sunday morning, July 30, we went on board and spent most of the day, breakfasted and dined; then there was no sickness on board. On Sunday morning August 6, I went on board at about 10 o'clock and saw the mate with his head tied up, walking about; he came in the cabin while I was at breakfast; he did not speak to me; the captain said he had been dissipating and came on board that morning sick; he died Thursday morning, August 10, at about 8 o'clock. On the 8th August I addressed a note to Dr. Herron to go on board. Then I did not know there was any other sick persons on board, but next day the captain reported the cabin boy and a seaman sick. Dr. Herron did not get my note the day it was written, or if he did, he did not call to see me till next day, then the 9th August; the cabin boy and seaman was sick. Consigned to D. F. Sullivan and loaded by the Stevedore Moncelim Yrdarte.

Spanish brig *Francisco*, S. Triay, master, at Pensacola, from Matanzas, in ballast. Arrived at quarantine July 26, 1882. Sickness appeared after arrival at quarantine, on August 15. She was ordered to Ship Island same day. Went to Ship Island and did not return to Pensacola. She was consigned to H. Baars.

Spanish bark *Albina*, 232 tons, L. Camps, master, at Pensacola, August 28, 1882, from Havana, in ballast. This vessel laid at quarantine a long time. I think there was one man sick on her while at quarantine, but no deaths. She loaded in the bay. Consigned to H. Baars.

Spanish bark *Prencesa Dargmar*, 431 tons, Ade Abarva, master, at Pensacola, September 12, 1882, from Havana, in ballast. Had a crew of 12 in all. Did not hear of any sickness on her. She loaded in the bay. Consigned to H. Baars.

Spanish bark *Rufina*, 394 tons, San Martin, master, at quarantine, August 31, 1882, at Pensacola, September 20, 1882, from Matanzas, in ballast. She had no sickness. While at quarantine one man was drowned. When she arrived at quarantine had a crew of 12 in all.

SAILINGS FROM CITY OF PENSACOLA.

Spanish steamship *Federico*, 1,459 tons, J. A. Larrauri, master, June 20, 1882, for England, with lumber.

Spanish — *Eliza*, 250 tons, J. A. Laucinca, master, June 20, 1882, for France, with lumber. This vessel came from Matanzas, in ballast; reported arrival at this consulate May 9, 1882. Had a crew of 11 in all. I did not hear of any sickness on this vessel. This vessel laid at Pensacola and Louisville Railroad wharf.

Spanish steamship *Murciano*, 1,552 tons, E. Luzarraga, June 28, 1882, for England, with lumber. Loaded in the bay.

Spanish bark *Fermina*, 232 tons, J. Menendez, master, July 10, 1882, for Cienfuegos, with lumber. Loaded at Perdido Railroad wharf.

Spanish schooner *Sofia*, 320 tons, *Slorca*, master, July 17, 1882, for Havana, with lumber. Loaded at Perdido Railroad wharf.

Spanish bark *Saleta*, 336 tons, Menchaca, master, August 10, 1882, for Bilbao via Havana, with lumber. Cleared with 9 men in all; 2 sick.

Spanish bark *Albina*, 232 tons, L. Camps, master, October 2, 1882, for Havana, with lumber. Had a crew of 12 when she sailed, and had no sickness while loading or while at Pensacola.

Spanish bark *Prencesa Dargmar*, 431 tons, Ade Abarva, master, October 3, 1882, for England, with lumber. Had crew of 12 in all and no sickness.

Spanish bark *Rufina*, 394 tons, San Martin, master, October 10, 1882, for Antwerp, with lumber. Had crew of 11 in all; had no sick.

C. L. LE BAUM, *Vice-Consul*.

Vincenzo Accame, arrived on the 8th day of July, 1882. Captain and mate died in Pensacola. Said vessel had some connection with *Saleta*. Lost three seamen at Ship Island.

Rosa B., arrived on the 21st of July. Captain, mate and two seamen died at Ship Island. Sailed August 19, 1882.

Gelileo S., arrived the 2nd day of August. Lost four seamen after putting back at Hampton Roads. Sailed, Pensacola August 17, 1882.

Duc Annis Lijuri, arrived Pensacola from Buenos Ayres, August 2, 1882. Sailed August 19. Lost Captain and mate at sea and three seamen at quarantine station.

Sollecito, arrived September 6 from Saint Vincent. Cleared on September 20. Lost boatswain at Pensacola.

Catterina Accane, arrived on August 19. Lost four seamen.

Catterina —, arrived September 12. Sailed November 2, 1882. Lost captain and three seamen. Put in Havana with Captain and cook dead.

Agostin Gueseppe, arrived October 11. Sailed November 7, 1882. Lost captain and one boy in Pensacola.

Elena, arrived October 31. Seamen died on board 19th of November.

Pride of the Ocean, from Matanzas arrived from quarantine 17th July. One man died of heart disease, as reported at quarantine station.

Cambay, from Jamaica, arrived from quarantine 10th August. One man died on board, of yellow fever, 28th August.

Karnak, from Rio, arrived from quarantine 24th August. One man sent to hospital sick with yellow fever. Sent to hospital September 14. Died September 19, 1882. Master and mate also sick; previously on board ship, of same disease.

Rhoda, from Rio, arrived from quarantine September 4, 1882. One man sent to hospital sick with yellow fever, October 5, 1882.

Wave King, from Rio, arrived, quarantined, September 26, 1882. Several cases of yellow fever aboard, besides three men left in hospital, with same when ship proceeded to sea. After being at sea several days yellow fever again appeared on board; one man died; vessel returned with two cases, reaching Pensacola November 1, 1882. She left on October 10, 1882. One man died since second arrival.

Laura Emily, from Bahia, from quarantine, August 9, 1882. One man died aboard, of yellow fever; same date two sent to hospital, same disease, one of whom died August 23. The British bark Pride of the Ocean, from Matanzas, arrived in Pensacola from quarantine July 17, 1882.

Party on board on night of 25th July or thereabouts:

Fred. O. Howe had yellow fever, but not till middle September; Harry Howe, since dead of typhoid fever; Ed. Tarble, since dead of yellow fever, taken sick in October; John Coe; Gibson Merino; Scaritt Merino; Mansfield Merino; Frank Simonson; — Huntington, since left city; W. Norton, since left city.

None of this party could have contracted or carried infection from this vessel, in my opinion, unless it can be shown that they either were taken down with disease or communicated the same within a short time after above date. So far as I know, none were thus affected, nor did any sickness appear in their respective families.

There were several other parties on board this ship about the same date as above and thereafter. Dr. Renshaw, I think, took them off.

While we were aboard we remained entirely in the after part of the vessel, mostly on deck; were below in the cabin for a short time. We were aboard about three hours.

The captain, Henry Barclay, was taken dangerously ill with fever some eight or ten days after date above mentioned (July 25), and was very sick indeed. He was attended by Dr. Renshaw, who pronounced him a very sick man, and, I think, diagnosed the disease as malaria fever. It is my opinion, however, and that of others, that Captain Barclay suffered from yellow fever. The attack lasted only some eight or nine days, I think, and was very severe; still, though weak and debilitated on coming out, he was cured, whereas an attack of malarial fever would probably have kept him longer confined aboard. There was no other sickness aboard, except a man who died at quarantine, as reported, of heart disease.

Immediately after arriving from quarantine, however, nearly the entire crew were discharged in this port. Names as follows; date of discharge, July 20, 1882:

Turney Rhodes, or Charles Turney; James Hughes; James McLeid; Benjamin Gage; Aksel Gabrielson; Thomas Mullen; F. Scheiber; Patrick Hamile; John Bergaton; John Blair; Archibald Ferguson; Michael Nilssen; James Newton; John Black; James Elliot; William Miller; C. Barkwright, William Capen, John Fisher reshipped on same vessel. Total, 19, less 3 reshipped.

Others of these sixteen seamen may have reshipped on other vessels, or left town; we have no record. They all probably while here boarded at some of the sailor boarding houses, and the proprietors of these places, Glennon, O'Brien, &c., can doubtless give some information concerning them.

There is little doubt that this vessel must have had infection aboard. Such a hypothesis is at least almost as probable as to assume that other vessels here at that time were infected. It must also be remembered that this ship was one of the earliest, if not the very earliest, on which such a suspicion can be thrown; whether this infection was contracted at Quarantine or previously it is impossible to say, and remains

to be determined, and can be better so determined by ascertaining how she laid while in quarantine, in what proximity to other vessels, what communication was held, &c. The fact remains that she was from Matanzas, an infected port, and she may as well have brought yellow fever direct from there as elsewhere.

SPREAD OF YELLOW FEVER IN THE COUNTRY SURROUNDING PENSACOLA.

It appears from my investigations that those places in the neighborhood of Pensacola, which adopted stringent quarantine regulations were spared the appearance of the disease, whilst other localities, not similarly protected, were smitten with the pestilence. A striking instance of the truth of this assertion is furnished by the history of the Navy Yard 6 or 7 miles distant from Pensacola. In this connection I refer to the following copy of a letter from Surgeon A. M. Owen, United States Navy, in charge of the yard:

NAVY-YARD, PENSACOLA, FLA.,
November 12, 1882.

DEAR DR. MARTIN: I received your telegram late last night. I lose no time in replying, although I have but a few minutes in which to make the acknowledgment,

I regret very much that I must thus be so brief in the matter, relative to your communication, however, I can give you the main facts in a few words. There has been no case of yellow fever this year within the cordon around the naval reservation; thus the quarantine has been efficient to the highest degree. As you have noted, the disease has spread from the city of Pensacola into the adjacent country, and has been on the north, east, and west points of our station.

On the 10th August news came to us that yellow fever had appeared on board a vessel—Spanish bark *Saletta*—moored at one of the wharves in Pensacola. In accordance with my recommendation the commanding officer here at once established a partial quarantine against the city in question. No officer, man, or marine was permitted to go to Pensacola, save by special permission to be granted only in case of urgent necessity. No boats, or members of the officer's families, were allowed to leave the yard for any purpose, and the citizens of the reserve were restricted, under certain conditions. In a few days I became convinced that the fever had gotten on shore, in Pensacola, and August 14 I so stated in an official letter to the National Board of Health. I then advised the commandant here to still further restrict intercourse between the station and Pensacola. This advice was promptly acted upon. No visitors were allowed to land upon the reserve from the said city. The mail-boat touched the wharf in Warrington, giving the mail matter to guards, posted by order of the commanding officer to receive it. No other communication with the steamer was granted. This state of affairs lasted until the morning of the 28th August, when we got the official news that yellow fever existed in the city of Pensacola. I instantly recommended that a cordon be established around the entire reserve, and that nobody be permitted to come within the said line for any purpose whatsoever. To this end, all the workmen of the yard were assembled, and in two hours' time the blockade was complete. At first the marines were ordered out upon this duty, but I objected to their employment upon such service, as I judged it proper and judicious that acclimated men only should be placed on the lines. Moreover, I urged in writing that all the marines, as well as all the officers whose services were not imperatively demanded at this time here, be ordered to quit the station at once, and that all the families of officers go with them to a place of safety. These recommendations were carried out by the officer in command.

I need not go into these particulars further, but merely add that about the middle of September the citizens of the reserve came to the assistance of the Government, and every male resident above the age of sixteen years was enrolled as a volunteer to aid in maintaining the cordon. Over 400 names were thus put upon the rolls.

The quarantine has been kept up without a break throughout. The captains of watch inspect the entire line of outposts frequently, day and night, and Lieutenant Welch and I give it our personal attention.

Of the difficulties and annoyances we have had in keeping the blockade inviolate you can surmise, when you recall the position here, and the general character of our people living inside and out the cordon. Had it not been for a few friends in Mobile, notably Sheriff Peter Burke and Dr. Fournier, health officer of that city, we would have, in great probability, had to give up in part the quarantine against the neighboring districts, owing to the lack of provisions; but thanks to those named, our wants have been supplied. However, of late, Mobile has become chary of us, owing to the reports getting abroad that the scourge had appeared among our residents.

Save a few cases of bilious remittent fever, contracted by our watchmen on picket at the Great Bayou bridge, we have had nothing simulating yellow fever.

So much for a hurried and partial history of our status at the naval reserve. I trust, doctor, you will get some information from this sketch, and with my compliments to you and cordial good wishes, believe me,

Yours, truly,

A. M. OWEN.

I also call attention to the following reports by Dr. Frank Renshaw and Mr. M. G. Yniestra, relative to the spread of the disease to unprotected points in the country:

PENSACOLA, FLA., November 17, 1892.

DEAR SIR: Agreeably to your request, I most respectfully submit this my statement of the observations in reference to the character of the recent epidemic of yellow fever that has devastated our little city.

The first case that I saw which I regarded as yellow fever was that of the mate of the Vincenzo Accame, which had been treated some days by Dr. Bouvier, who kept the board of health advised of symptoms but had made no official diagnosis; which case was seen by Dr. Hargis on the 24th of August, in consultation with Dr. Bouvier.

On the 25th of August I was called, during the absence of Dr. Bouvier. I visited the patient; I diagnosed the case; I pronounced it yellow fever; I orally reported this opinion to Dr. Hargis, and subsequently I wrote to the board of health a letter respecting this case. This was the first case on the bulletin of the board of health.

Orders were immediately issued for a thorough *post-mortem* at quarantine station, and I have cause to believe that the accuracy and force of my diagnosis was doubted. The autopsy was conducted by Drs. Leonard and Carrington, the regular appointees of the board. Yet their professional skill, even after the use of the knife, was such that they could not hesitate to approve and re-enforce my pathologic position.

They sustained my diagnosis, and with the acquiescence of the other physicians it was firmly established. The next case was that of the mulatto boy who had been employed at Mr. J. B. Roberts's stable, almost adjoining the house in which the Rossarios resided. He died about the 8th of September, and from yellow fever, fatal symptom, suppression of urine. This may assist you to indicate the forms of infection. These seem to be pertinent cases to mention.

I kept no notes of the many cases coming under my treatment afterwards, between the dates of the 25th of August and the 3d of September.

The number of cases which I treated indicates (without being able to give any absolute statistical information) that the African race was much more liable to the ravages of the disease than the Caucasian, while the mortality among the blacks was much less than among the whites, say as three to one.

This is a report of my city practice, as far as I can satisfactorily detail it from my meager data; but I attended some cases in the country about Pensacola that may not lack interesting features. Use them if you wish, with the assurance that I have no indisposition to co-operate with you in any work which the National Board of Health may intend for the advancement of medical science.

These last were in several neighborhoods, first the Nix farm cases. The Nix farm is situated in Escambia County, Florida, overlooks the Perdido Bay, and is 17 miles from Pensacola and 12 miles from the Gulf of Mexico. The expansive mouth of this bay admits free and copious ingress and egress of salt water, and is affected by the tidal influences of the ocean.

Notwithstanding the waters of the Perdido and Styx Rivers, which empty into this bay several miles to the northeast of the "*locus in quo*," the water is sufficiently chlorinated to afford an agreeable pabulum for the existence and propagation of the crustacea, mollusks, and the finny tribe inhabiting those deeps. The surging wave throwing in undulating masses the white sands borrowed from the beach, the character of the adjacent lands, together with a porosity eminently calculated to absorb all excreta and other contaminating causes of disease, enable nature to create her own system of sewerage.

The hygienic conditions existing there, in conjunction with the testimony of those who have resided there for the last fifty years, account for the remarkable healthiness of the locality.

Now it devolves on us to investigate as to the introduction of this hydra, which has so insidiously invaded the precincts of this lonely and happy home, and desolated the hearthstone of a family peculiarly theretofore blessed with domestic bliss.

On or about Friday the 22d of September, a person by name of Grant, from the vicinity of Milton, en route for Baldwin County, Alabama, afoot, passed through Pensacola, stopping at the house of Mr. Matthews, a neighbor of Nix remaining all night, and was ferried across the Perdido Bay the following morning. Several days subsequently reliable information was brought Mr. Nix that said Grant had died, after a brief illness, and the presumption from the symptoms and the *post-mortem* appearances as described induces the opinion, taking into consideration after-developed facts, that this was a very suspicious case.

On the 29th of September, Mr. Matthews's child, eleven years old, sickened. Symptoms, pain in head and back; high temperature; hemorrhages from bowels; gastric irritability; suppression of urine and black vomit supervened, and after death the characteristic features of yellow fever were presented. The patient died within three or four days.

On the 1st of October, Mr. Matthews visited Mr. Nix's residence; was in conver-

sation with Miss Adel Nix, aged fourteen years. On the 7th of this same month, this young lady sickened and died on the 11th of that ultimo. Fatal symptom, suppression of urine.

The next case was a brother of the last-mentioned patient, who had a very mild attack and recovered. On the 12th, Miss Mary Nix, aged sixteen, was seized and died on the 16th, of suppression of urine and black vomit.

The information relative to the foregoing cases is quite reliable, emanating from a very intelligent member of the family, Mrs. Margaret Duncan who has had vast experience in nursing yellow fever, as well at Pensacola, the navy-yard, and Barrancas.

I reached the last-mentioned patient after her death, but examined the black vomit on a piece of blanket with yourself, and we concluded that it was a genuine instance.

On the same day Miss Nettie Nix, aged eighteen, sickened, and this came under my observation. When called to her bedside her temperature was 104°; pulse 80 beats per minute; jaundiced slightly; face flushed; eyes bright and watery; conjunctiva of a yellow tinge; urine highly albuminous; stomach extremely irritable; jactation and a tendency to suppression of urine. The fever was subsiding; on the morning of the 19th she convalesced.

The twin sons of Mr. Fells were the next to fall victims at this house. Their age was 13 years, and both cases came under my observation, and dying from suppression of urine and black vomit on the 4th and 5th days of the sickness, respectively.

The other cases that I saw, in all ten in number, at that house, with a mortality of 40 per cent., recovered. This terminates the record of the ravages of the disease at this place.

The next family in which the yellow fever made its appearance from the same source of communication was that of Mr. Foley, residing about 2 miles from Mr. Nix. It was carried to this place by Mrs. Foley, who, actuated by those virtuous sentiments that preponderate prudence and holds self-preservation in subjection, glorifying woman's nature, she sympathetically responded to the wants of her neighbors and bravely faced the dreaded foe, and was stricken down with her husband and children, all recovering with the exception of a bright lad of sixteen years, a sacrifice to the ends of charity. This boy who died had fever which lasted for four days. He had hemorrhages from the bowels on the third day, with black vomit on the fifth day when *in articulo mortis*.

From the Nix vicinity I can give no further information, because I have no knowledge of other cases there existent. This terminates my experience at that locality.

Powelton, a station on the Louisville and Nashville Railroad, in Escambia County, Florida, 15 miles from the city of Pensacola, was the next scene of my professional labors. The residence of Mr. Suggs was invaded by the protean aggressor against the lives of our people of this latitude. Elevated, and compassing an equable climatic influence, this dwelling, the adjacent lands of which are naturally drained by a brooklet that lies at the foot of an undulating slope—this dwelling was built in the very *situ* of healthiness. Notwithstanding that the surrounding pines, which gracefully bent their curative, balsamic boughs to the influence of the gentle zephyrs, and imparting to the atmosphere a vigor and vitality that may laugh to scorn all menaces of a malarial poison, yellow fever—fell foe, and always most treacherous in its assaults—made a lodgment on the 25th day of September, 1882.

A son of Mr. Suggs, who has been living in Pensacola plying his trade as a carpenter for several months, and on the day previously mentioned returned to his rural home. Leaving here with a fever and other pathognomonic symptoms that indicated yellow fever, he arrived at Powellton, carried in a wagon, and was subsequently, although his was an unmistakable case, a remarkable instance of recovery.

David Suggs, one week afterwards, was down with a fever characterized by similar symptoms, followed by his father and mother and three other brothers, all dwelling together. Fortunately these cases, without exception, recovered under my treatment.

There were some cases under my treatment in this city between August 25 and September 10 which I omitted to mention in the beginning of this report.

These cases were those of Mr. Cater, who sickened on the 26th of August; mother and child, near Tom Glennon's, on Front street, and a few doors from Palafox street, on the same day, the child dying in three days and mother recovering. Tom Story, mate of ship Laura Emily, lying off ice-house wharf, say 200 or 300 yards, who sickened on 4th of September, died; and on September 9, Mr. R. W. Small, master mechanic of Louisville and Nashville Railroad shops, who left for the North, and was taken sick at Molino on the 9th and recovered.

I have endeavored to give you, and others similarly requesting, the data above compiled. I trust that you may be able to utilize it, should you perceive the existence of value, in the interest of medical science, which alone I have wished to promote by my commentaries upon my cases.

Yours, very truly,

F. G. RENSHAW, M. D.

WILLIAM MARTIN,
Assistant Surgeon, U. S. N., Pensacola, Fla.

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Notes in relation to the yellow fever at Avery's, on the Pensacola and Atlantic Railroad, about a mile from Magnolia.

Its inception was at Captain Woods's, whose wife died on the 20th of September. It was unquestionably carried to that locality by Mrs. Woods, who made frequent visits to the city, principally in the vicinity of Wright's mills, in the midst of the worst infected district of Pensacola. Edward Avery's family being neighbors, members of it visited Mrs. Woods during her illness and assisted to lay her out. The following Saturday Mr. Edward Avery and his wife and two children were taken down with the fever, and Mr. E. Avery died on October 3. The following day Mr. George Avery and his three children were stricken; his wife followed five days afterwards. Mr. Dunn and his daughter, both of whom had been nursing, and in daily communication with the cases in the Avery families, were seized by the fever. Then Mrs. Whitten, about 200 yards from Dunn's, and her four children and her sister were taken down with the disease. Mr. Marks Joseph, who nursed in George Avery's family, was the next and last victim in that settlement. All recovered save Mrs. Woods and Mr. Edward Avery. The total result was nineteen cases and two deaths. These cases were attended by Mr. Moses Yniestra, assisted by Dr. Jones, at the instance of the board of health, who sent nurses, medicines, and the necessities of life, thereby preventing a mortality which would, from the isolated situation of these people, inevitably have resulted. There were not 100 yards of intervening space between the habitations. The disease came to Woods's from Pensacola and returned in this direction, never going beyond on the track of the Pensacola and Atlanta Railroad.

M. G. YNIESTRA.

I am indebted to the courtesy of M. McGauran, sergeant Signal Service, United States Army, for a daily report of meteorological observations during the months of August, September, and October, 1882. From these it appears that in August the prevailing winds were from the southwest; in September and October from the northeast.

Meteorological data for August, September, and October, 1882. United States Signal Office, Pensacola, Fla.

[M. McGauran, observer.]

AUGUST.

Date.		Average barometer.	Temperature.			Mean dew-point.	Mean relative humidity.	Prevailing wind.	Mean cloudiness (scale 0 to 10).	Rainfall (inches and hundredths).
			Mean.	Max.	Min.					
1882.										
Aug.	1	30.056	80.5	88.7	76.8	74.3	82.7	N.	6	.07
	2	29.986	78.7	87.8	73.7	72.7	83.0	N.	4	±
	3	29.906	80.7	87.6	72.2	74.3	82.0	SW.	7	.10
	4	29.967	78.8	82.6	74.1	74.3	86.7	S.	10	1.95
	5	30.016	77.3	82.7	71.5	73.7	89.0	SW.	6	2.05
	6	30.162	80.0	86.0	75.1	75.3	86.3	S.	3	0
	7	30.128	81.0	87.7	73.5	74.3	81.0	SW.	1	0
	8	30.024	82.9	91.6	75.0	77.0	82.7	SW.	1	0
	9	30.001	82.3	92.0	70.1	74.0	76.7	SW.	4	.58
	10	30.052	81.0	87.1	74.8	73.3	77.3	SW.	3	0
	11	30.089	78.1	85.2	73.6	72.0	82.3	SW.	5	1.22
	12	30.082	78.3	85.4	74.0	73.3	86.0	SW.	6	.02
	13	30.071	80.2	87.0	72.3	72.0	77.7	W.	3	.01
	14	30.012	79.8	90.8	73.5	71.3	76.0	NW.	3	±
	15	30.023	82.1	91.0	75.3	73.0	75.3	W.	3	0
	16	30.081	82.2	88.3	75.2	73.3	75.3	S.	4	±
	17	30.070	78.3	88.8	76.8	74.3	88.0	S.	8	1.31
	18	30.011	77.3	84.7	71.3	73.0	86.7	S.	6	.41
	19	30.027	77.8	83.9	72.0	71.7	82.3	W.	9	0
	20	30.099	76.7	80.0	73.2	73.3	90.3	E.	10	2.00
	21	30.132	75.4	78.3	73.2	74.0	96.0	NE.	10	2.16
	22	30.130	77.2	81.3	73.5	73.3	88.3	SE.	8	2.32
	23	30.082	78.4	83.4	71.4	73.0	84.7	SE.	9	±
	24	30.024	77.1	82.3	73.0	73.7	89.7	E.	8	.01
	25	29.998	76.9	82.7	73.7	74.0	91.0	S.	10	.64
	26	30.002	76.5	80.0	70.8	72.7	88.7	S.	10	1.43
	27	29.957	75.9	81.7	72.0	74.0	94.3	SW.	10	.71
	28	29.860	76.9	84.0	72.7	73.3	89.3	SW.	6	.15
	29	29.919	77.2	83.3	71.4	73.0	86.7	SW.	5	±
	30	30.017	78.1	84.0	72.3	73.7	87.0	SW.	4	1.20
	31	30.068	80.0	85.6	73.0	74.0	82.7	S.	1	.05
Means		30.037	78.8	85.3	73.3	73.5	84.7	.....	6	.593

Meteorological data, &c.—Continued.

SEPTEMBER.

1882.											
Sept.											
1	30.066	80.1	86.1	74.4	74.3	83.3	S.	0	0		
2	30.071	79.6	86.6	74.3	73.7	82.7	S.	2	0		
3	30.083	80.3	88.1	72.7	73.3	81.0	N.E.	6	0		
4	30.079	80.0	88.2	73.6	72.7	79.3	N.E.	1	0		
5	30.080	81.4	91.1	74.0	73.3	77.3	N.E.	4	0		.01
6	30.023	80.5	89.0	73.6	72.7	78.0	N.E.	1	0		
7	29.953	81.7	88.2	73.6	74.7	79.3	S.E.	0	0		
8	29.864	79.0	88.3	72.2	74.4	87.0	S.E.	8	0		.56
9	29.586	68.8	74.2	64.0	67.7	95.7	N.E.	10	0		4.87
10	29.773	71.7	77.5	65.4	66.7	84.7	N.W.	7	0		.01
11	29.927	71.7	82.1	65.0	60.7	70.7	N.W.	0	0		
12	30.052	72.0	82.2	64.3	61.0	70.7	N.E.	1	0		
13	30.080	74.7	81.3	65.0	62.7	67.0	E.	1	0		
14	30.132	74.9	82.5	69.1	65.7	73.3	N.E.	5	0		
15	30.068	75.8	86.0	67.0	67.3	76.7	SW.	2	0		
16	30.062	76.9	86.2	69.6	70.0	80.7	SW.	0	0		
17	30.098	78.7	85.4	72.1	72.0	81.0	S.	4	0		
18	30.143	79.3	86.1	73.0	73.3	83.3	S.E.	0	0		
19	30.147	77.0	84.8	70.2	71.3	84.0	S.	0	0		
20	30.114	77.5	86.4	70.3	71.0	82.7	S.	0	0		
21	30.074	76.6	85.4	71.5	71.0	84.0	S.	0	0		
22	30.069	70.0	77.3	65.0	62.3	77.3	N.	6	0		
23	30.042	67.4	77.6	57.3	53.7	63.7	N.	0	0		
24	29.998	71.0	80.8	60.0	61.0	72.0	N.E.	3	0		.11
25	30.029	72.0	81.2	67.6	66.0	82.3	N.E.	8	0		1.03
26	30.006	71.7	79.4	66.7	62.7	74.3	N.E.	5	0		.07
27	29.958	69.3	80.0	62.1	59.0	71.3	S.	0	0		
28	30.027	69.4	79.3	64.3	64.7	85.3	E.	5	0		1.37
29	30.118	73.1	78.2	70.7	71.0	98.7	S.E.	6	0		.47
30	30.135	76.2	80.2	70.3	71.3	85.7	S.E.	6	0		
Means	30.081	75.3	83.3	68.6	68.1	79.6		3			.283

OCTOBER.

Date.		Average baromet. ter.	Temperature.			Mean dew point.	Mean relative hu- midity.	Prevailing wind.	Mean cloudiness (scale of 0 to 10).	Rainfall (inches and hundredths).
			Mean.	Max.	Min.					
1882.										
Oct.	1	30.082	73.8	78.2	71.1	66.0	77.0	N. E.	9	0
	2	30.032	71.9	75.2	69.4	66.0	82.3	N. E.	10	.12
	3	30.040	74.9	82.2	70.4	65.0	71.7	N. E.	5	0
	4	30.100	73.5	81.7	67.0	56.7	57.3	N. E.	0	0
	5	30.115	74.4	81.6	68.0	63.3	63.7	N. E.	4	0
	6	30.108	73.4	80.0	68.6	64.7	75.0	E.	1	0
	7	29.990	72.9	79.8	67.6	66.3	80.3	S. E.	2	0
	8	29.875	72.8	75.6	71.0	69.7	90.3	S. E.	8	.59
	9	29.897	74.6	81.2	69.0	68.7	82.3	N. E.	6	.04
	10	29.794	77.0	84.2	70.3	65.0	67.7	N.	6	0
	11	29.803	77.6	87.3	69.3	67.0	71.7	N. W.	2	0
	12	29.944	75.6	81.2	69.6	70.7	65.3	S.	2	0
	13	29.989	71.6	81.1	67.1	69.3	72.3	N.	5	2.01
	14	30.019	69.1	78.2	61.6	56.0	67.0	N.	0	0
	15	30.026	73.4	79.0	66.4	68.7	85.7	N. E.	7	0
	16	29.973	72.9	78.0	69.8	70.0	92.0	E.	8	.32
	17	29.961	75.8	81.0	72.0	71.7	87.7	S. E.	3	0
	18	29.983	77.3	82.2	73.1	72.3	84.7	S. E.	2	.25
	19	29.908	71.4	81.0	63.3	67.7	88.7	S.	10	1.46
	20	29.906	65.3	71.8	62.1	59.3	82.0	N.	6	.03
	21	29.995	64.6	68.5	61.9	58.7	81.7	N.	10	0
	22	30.031	64.9	71.2	60.3	60.0	84.7	N.	6	0
	23	30.065	66.1	75.2	60.2	58.3	77.3	N.	3	0
	24	30.138	62.3	74.7	53.2	48.0	65.3	N.	0	0
	25	30.172	63.1	74.0	55.7	54.0	74.3	S.	0	0
	26	30.206	63.1	73.9	54.6	56.0	79.0	S. E.	0	0
	27	30.142	65.0	74.8	57.4	60.3	85.7	S. E.	3	0
	28	30.074	69.9	76.2	62.4	65.0	85.0	S. E.	8	.03
	29	30.086	70.9	78.1	66.4	67.0	88.0	S. E.	4	0
	30	30.012	73.6	80.1	65.3	70.3	90.7	S. E.	7	0
	31	30.021	73.3	76.7	72.0	72.0	96.0	E.	7	.24
Means.....		30.018	71.2	78.2	65.7	64.3	80.5		4.6	.163

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I am also under obligations to Sergeant McGauran for a table of comparative meteorological statistics of Pensacola for the months of May, June, July, August, September, and October, in the years 1880, 1881, and 1882. This table shows that the mean temperature for the months specified was lower in 1882 than in either of the two previous years.

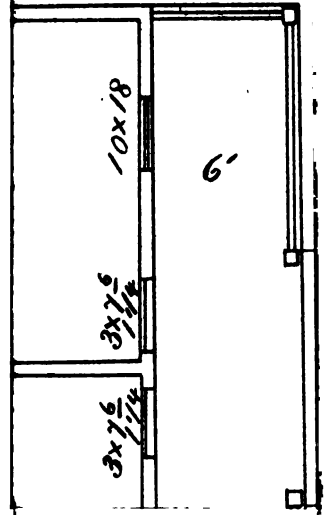
Comparative meteorological statistics.

UNITED STATES SIGNAL OFFICE, PENSACOLA, FLA.



	1880.	1881.	1882.
MAY.			
Average barometer.....	30.039	30.005	30.016
Average temperature.....	74.4	76.1	72.8
Highest temperature.....	88	93	85.7
Lowest temperature.....	56	64	52.1
Total wind movement, miles.....	7,287	5,488	7,155
Highest hourly velocity, miles.....	30	20	24
Prevailing wind direction.....	SE.	S.	S.
Total rainfall, inches.....	5.85	1.40	3.51
Number of days rain fell.....	16	26	8
JUNE.			
Average barometer.....	30.065	29.985	30.030
Average temperature.....	80.1	82.1	79.8
Highest temperature.....	92	97	90.9
Lowest temperature.....	66	64	66.0
Total wind movement, miles.....	6,750	5,389	5,957
Highest hourly velocity, miles.....	31	32	32
Prevailing wind direction.....	S.	SW.	SW.
Total rainfall, inches.....	2.75	4.27	3.95
Number of days rain fell.....	20	18	11
JULY.			
Average barometer.....	30.076	30.007	30.082
Average temperature.....	80.9	82.9	78.5
Highest temperature.....	92	97	93.4
Lowest temperature.....	69	71	64.2
Total wind movement, miles.....	4,967	5,100	4,511
Highest hourly velocity, miles.....	22	30	24
Prevailing wind direction.....	SW.	S.	S.
Total rainfall, inches.....	2.75	5.59	7.02
Number of days rain fell.....	14	12	20
AUGUST.			
Average barometer.....	30.006	29.987	30.037
Average temperature.....	80.3	81.1	78.8
Highest temperature.....	93	98	92
Lowest temperature.....	70	69	70.1
Total wind movement, miles.....	5,274	6,412	4,525
Prevailing wind direction.....	SW.	SW.	SW.
Total rainfall, inches.....	4.68	18.52	18.39
Number of days rain fell.....	19	10	26
SEPTEMBER.			
Average barometer.....	30.067	30.026	30.031
Average temperature.....	75.6	78.7	75.3
Highest temperature.....	92	98	91.1
Lowest temperature.....	58	62	57.3
Total wind movement, miles.....	5,005	5,444	5,081
Prevailing wind direction.....	SW.	SE.	NE.
Total rainfall, inches.....	11.54	8.47	8.49
Number of days rain fell.....	15	18	8
OCTOBER.			
Average barometer.....	30.093	30.100	30.013
Average temperature.....	67.4	73.7	71.3
Highest temperature.....	84	89	87.8
Lowest temperature.....	45	51	58.2
Total wind movement, miles.....	6,119	5,932	5,532
Prevailing wind direction.....	SE.	NE.	NE.
Total rainfall, inches.....	7.08	4.93	5.05
Number of days rain fell.....	17	9	9





QUARANTINE.

The Pensacola quarantine station is situated on Santa Rosa Island, about 5 miles southwardly from the city. New buildings were erected last spring by the National Board of Health, and the quarantine establishment was fully equipped. I subjoin a ground plan of the buildings at the station, and a letter from the contractor describing the ballast crib and specifying the amount of the contract, which was \$6,886.85.

PENSACOLA, FLA., *December 10, 1882.*

MY DEAR UNCLE, DR. HARGIS :

I have yours of December 7. My contract with the Board was under date April 15, 1882.

Total amount of contract.....	\$6,226 00
Extras (\$278,382.85).....	660 85
	<hr/> 6,886 85

Amount paid about July 10, 1882.

Inclose ground plan of buildings. I haven't the original plans and specifications. Work was finished as per contract in forty-five and sixty days after date, i. e., June 1 and 15.

Crib cost \$2,617.85, and built of green-pine piling, driven in the bay, then capped with 10 by 12 timber, and a spike 21 inches long driven through the capping into the head of each pile, then fastened crosswise by four pieces of timber running from one row of piling to the other, and by three pieces lengthwise, which were secured by bolts, &c. It is 75 by 100 feet. It was thoroughly and strongly put up, and I have no idea why it gave way, unless the dumping of all ballast on the side which gave way, instead of placing it in the center, created an unlooked for pressure, or the cross braces were displaced by some vessel tied to the capping. The latter proposition is, I think, correct. The timbers have split from the bolts fastening them, and the piling, then having nothing for support, gave way under pressure of the ballast. These timbers would not have split away from the bolts without some unexpected and uncalled for strain, such as a vessel would create while being tossed in some of the severe gales we had last summer. The crib was occupied long before it was finished—say about June 1 it was first used, and the buildings taken possession of about July 1. Crib is about 600 yards from hospital; about 1 mile from the buoy; channel of sound about 200 yards from crib, and old crib about three-quarters of a mile off. Crib had fender timbers all around, suspended by chains 4 feet from top, and supplied with four posts for moorings.

Affectionately, yours,

STEPHEN LEONARD.

I also insert a copy of a proclamation by the board of health of the city of Pensacola, establishing quarantine and laying down the rules for the government of the same:

PROCLAMATION BY THE BOARD OF HEALTH OF THE CITY OF PENSACOLA.

SEC. 1. All vessels arriving at the port of Pensacola, on or after 15th May, 1882, whether foreign or domestic, and especially those from infected ports in which yellow fever is prevailing, or from ports where other infectious or contagious diseases are reported to exist, and all other vessels that shall have crossed the Atlantic Ocean between 32 north latitude and 30 south latitude to Pensacola, whether having touched or not at any intermediate port, are required to report at the quarantine station to be hereinafter designated, and *be inspected*, discharge ballast and submitted to a cleansing and disinfecting process, if deemed necessary by the quarantine physician.

2. Vessels arriving from an infected or suspicious port will be held in quarantine for the discharging of ballast, cleansing and fumigation, twenty days at least, or longer, if deemed necessary, from date of departure from said port.

3. Vessels arriving from ports named in section 2, requiring more than twenty days to complete voyage, will be held in quarantine ten days, or longer if deemed necessary by the quarantine physician.

4. Any vessel having on board any person ill with any infectious or contagious disease, on approaching the harbor of Pensacola shall be notified by the pilot that said vessel proceed at once to Ship Island for special sanitary care, under the direction given to the officers of the station by the National Board of Health.

5. No vessel arriving in the harbor of Pensacola on or after 15th day of May, 1882, or during the existence of quarantine operations for this year, shall under any circumstances land any person, boat or goods anywhere within the harbor of Pensacola, or approach the city of Pensacola, nor permit any person or persons, not legally authorized, to visit or communicate in any way whatever, until she shall have performed quarantine, in accordance with the regulations of the board of health of Pensacola.

6. The quarantine station shall be on Santa Rosa Island, just west of Little Sabine Inlet. The boundaries of the quarantine ground shall be as follows: Beginning at a point on the low-tide line of the gulf shore of Santa Rosa Island, three-quarters of a mile east of the eastern limit of the Little Sabine Inlet; thence across Santa Rosa Island and into Santa Rosa Sound on a line bearing north by west from the point of beginning to the middle of the channel of Santa Rosa Sound; thence westwardly along the middle line of said channel to a point in said channel, bearing southwest by south one-half south from Deer Point; thence on a line bearing southwest by south, one-half south from Deer Point to the north shore of Santa Rosa Island; thence on a line bearing south by east to a point on the low-tide line of the Gulf shore of Santa Rosa Island; thence along the low-tide line of said Gulf shore of Santa Rosa Island to the point of beginning; the points above described as being in the water to be designated by buoys bearing yellow flags, and those on land to be designated by yellow flags fixed on substantial poles.

7. The quarantine physician shall, as soon as quarantine is established, take his station at the quarantine station and remain within quarantine limits until the quarantine is removed, unless by special permit from the president of the board of health.

The quarantine physician shall be at all times, between sunrise and sunset, ready to visit and board all vessels immediately on their arrival in the bay off Deer Point, at a point to be designated by a buoy; upon which shall be erected a flag-staff, showing a yellow flag. He shall show a yellow flag conspicuously in his boat to designate her character, and if any vessel shall, under any circumstances, pass by the quarantine boat or buoy, or refuse to obey the order of the captain of the guard or quarantine physician, the master or owner of any vessel so offending shall be held to answer in a fine not exceeding \$500 and may be imprisoned until such fine with costs be paid.

The quarantine physician shall charge the visiting fee in all cases where he attends patients, either on board ship or in quarantine hospital, and for all medicines and supplies furnished to the respective vessels, said fees to be collected from the masters of vessels to which such patients belong, and paid over to the secretary of the board of health.

8. The quarantine physician shall have full and complete control of the quarantine station and hospital, and the employes therewith connected, subject to the orders of the board of health, and in all cases in which he deems it necessary shall require vessels in quarantine to discharge their ballast or cargo under his orders and direction, and undergo such fumigation and cleansing as he may deem necessary.

9. The quarantine physician shall examine into the condition of every vessel going into quarantine and the health of the persons on board, and shall not permit any vessel, or person from any vessel, to approach the city until the requirements of the preceding section have been fulfilled; and further, until he is satisfied that the public health will not be endangered thereby; and further, until said permit is countersigned by the president of the board of health.

10. All vessels entering the bay of Pensacola shall proceed directly to the quarantine, and no vessel shall anchor inside of the bar before she arrives at quarantine, except in cases of imperative necessity, in which case she shall at once make signal by hoisting her ensign with a wife (that is, tied around the middle), which will be a signal for a tug to come immediately. Any master or pilot violating this section shall be fined in a sum not exceeding \$300.

11. It shall be the duty of pilots or other persons bringing vessels into the bay of Pensacola to hoist a flag at half mast at the fore, and not to pass the quarantine buoy until the vessel has been visited by the quarantine physician; and it shall not be lawful for any person to visit or communicate with any vessel being taken into quarantine, or in quarantine, until said vessel has been visited by the quarantine physician and relieved from quarantine.

Any person found guilty of violating the provisions of this section shall be fined in a sum not exceeding \$300; and any master of a vessel permitting any such communication shall also be fined in a sum not exceeding \$300.

12. No pilot or other person shall leave a vessel, after coming into Pensacola Bay, without a written permit to do so from the quarantine physician.

13. All vessels at quarantine shall keep a flag at half mast at the fore during the day and a lantern in the same position at night.

It shall be the duty of the quarantine physician to cause any vessel having sickness on board to be anchored at least three-fourths of a mile from other vessels which have no sickness on board, and it shall be his duty to prohibit any intercourse whatever between such vessels.

Should any such intercourse take place it shall be his duty promptly to report it to the president of the board of health, and the master of every vessel so offending shall be fined in a sum not exceeding \$300.

14. Any person visiting or attempting to visit the station without permission from the quarantine physician, shall be fined in a sum not less than \$300.

15. Vessels at quarantine requiring fresh provisions shall communicate with the quarantine physician, who shall, if he deems it expedient, forward orders through quarantine boat.

16. It shall be the duty of the quarantine physician to visit every vessel coming from any port and entering the bay of Pensacola. He shall require the captain of every vessel thus inspected to pay the sum of \$5.

17. Each and every vessel fumigated shall pay for such fumigation at the rate of 5 cents per ton, and cost of the disinfectants necessarily used; and for discharging ballast at the crib 50 cents per ton, which said fees, together with all other quarantine dues, shall be collected in currency or by order on consignee by the quarantine physician and sent, forthwith, to the secretary of the board of health, to be set aside as quarantine fund, and paid out only on order of board of health.

18. The quarantine physician shall make a weekly report to the board of health, showing the number and class of vessels visited by him, amount of fees collected, number of patients treated, and quantity of ballast discharged, and any other matter which may be of interest.

19. That every pilot and pilot-boat on the bar of Pensacola, and master of tug, shall be supplied with copies of this proclamation, and it shall be the duty of every pilot to furnish a copy of this proclamation to the master of every vessel, which said pilot may speak or board immediately upon said communication.

20. Any violation of the quarantine shall be punished in the manner prescribed by act regulating quarantine, passed by the legislature and approved March 11, 1879.

21. All tugs (except when taking vessels into quarantine) and all crafts of every character going into or coming out of, or passing through quarantine lines, shall lay-to off, and as near the guard station as practicable, designated by a blue flag, and remain there until visited by the officer in charge of the guard and permitted by him to pass.

By order of the board of health.

ROBT. B. S. HARGIS, M. D.,
President.

J. C. WHITING, M. D.,
Secretary and Inspector.

It appears from facts gathered and testimony adduced that the quarantine was loosely conducted.

MEDICAL TOPOGRAPHY AND HISTORY OF PREVIOUS VISITATIONS OF YELLOW FEVER

With reference to the medical topography of Pensacola, it is thought that for the purpose of the present report this can be best described by quoting the following lines relative to the same, which are to be found in the valuable history of the yellow-fever epidemic of 1873, furnished Dr. Frank Riley, of the United States Marine Hospital Service, by Dr. James S. Herron, of Pensacola:

"The city of Pensacola is situated on the north side of Pensacola Bay, 9 miles from the entrance, in latitude $30^{\circ} 24' 36''$ north, longitude $87^{\circ} 13'$ west, and with a gradual slope of from 5 or 8 feet at the shore to 20 feet a quarter of a mile back, where there are several hills which rise suddenly to a height of from 35 to 40 feet. For the first three blocks the average height of the town is from 8 to 15 feet above tide water, and for the next three there are spring branches and swampy ground, covered for about two-thirds of the surface with dogwood, bay, and various thick undergrowth. This is partially ditched and drained, but is so boggy during almost the entire year that plank walks have been laid in order to permit pedestrians to cross it, and the roads for vehicles have been ditched and covered with ballast to render them passable. Immediately above this, and six blocks from the water's edge, the ground, which is a dry, sandy ridge, is several feet higher, and here, for the next three or four blocks back, are to be found the residences of the majority of the more affluent citizens. Some of this class, however, have their homes in the swampy section or in the business portion of the town. This latter comprises the first three blocks, to which the original city of Pensacola was limited in the old Spanish and English times. The outskirts of the swamps and the lower portions of the city are, for the most part, occupied by sailors, and stevedores' boarding-houses, drinking-saloons, negro huts, and dens of all sorts. This condition of affairs is not, however, of recent origin, and was no worse last year than at any other time; besides, the epidemic did not break out in these places, but in houses remarkable for cleanliness, but whose inmates had been exposed to the infection and were most susceptible to its influence. The fever, however, became very general before the end of the season. The water-side dens had less of it than elsewhere. I consider it probable, however, that most of their inmates had had it in some previous epidemic, for strangers, sailors, and others living there were usually attacked.

The swampy part of the city, which has been already described, is built on quite a limited extent. It was in as good a condition last year as in any previous one, and it could have had nothing to do with the epidemic, since the first cases were below and one above its limits, and persons residing there were not more liable to be attacked than were those who lived in other portions of the city."

In the history from which the foregoing extract is taken, I find the following account of previous epidemics of yellow fever in Pensacola, also from the pen of Dr. Herron:

"From the time the United States obtained possession of Florida to the present date yellow fever appears five times to have assumed an epidemic form in this port, and during that period it has also several times been brought here, but failed to spread. I shall first enumerate the former cases. In 1822 it was imported by a schooner sailing from the north to Cuba, and from there to Pensacola, with a cargo of spoiled codfish, which was discharged at the wharf, hauled through the town, and thrown out on a common. The first case and victim was Madama Del Barco, who lived just opposite. In 1853 it was introduced by the United States steamer Vixen; in 1863 by the United States steamship Relief (see account by surgeon B. F. Gibbs, U. S. N., in the American Journal of Medical Science for 1866); in 1867 by the ship Fair Wind and the schooner Texana, the former from Jamaica and the latter from New Orleans; and, finally, in 1873 by the British ship Golden Dream, from Havana.

"In enumerating the yellow-fever epidemic in this section, I have omitted to mention a pestilence which prevailed in 1846 at the navy-yard and at Barrancas, because, though generally spoken of here as yellow fever, such was not the verdict of surgeon Isaac Hulse, U. S. N., president of a board of physicians convened to investigate and report the nature of said fever, and composed of the following officers: Surgeons Terrill and Spencer, U. S. N., and Surgeon Stinneck, with Assistant Surgeons Abadie and Steiner, of the United States Army. The report of Dr. Abadie, U. S. A., in the Medical Statistics, United States Army, from 1839 to 1855, page 335, exactly agrees with that of Dr. Hulse, as he simply calls it 'a fever which prevailed at Barrancas barracks in the summer of 1846,' and it is not classed in that work as yellow fever. There is also a tradition here that the board reported that pestilence as a 'mongrel fever, and not yellow fever.' This testimony, I think, justifies its omission from the list. That sporadic cases of yellow fever have occurred here in the intervals of the various epidemics is well known, but most if not all these cases can be traced as having come off of vessels or from infected places."

I make the following extract from the report of the yellow fever at Pensacola in 1874, also furnished by Dr. James S. Herron, and published in the Report of the United States Marine Hospital Service for 1874:

"The yellow-fever epidemic which prevailed here this year (1874) appears not to have been of local origin, but to have been, as on all previous occasions, the result of importation. On the 25th of May quarantine was established and on the 27th the Spanish bark *Virtuoso* arrived from Havana, Cuba, and was duly detained. One of the crew was reported ill with yellow fever, and two were said to have died during the passage. May 29 a man was brought in in an insensible condition to the marine hospital, and was supposed to have congestion of the brain, but the yellow tinge of the skin aroused suspicion, which was verified by his death from black vomit on the next evening, May 30. After death the body turned quite yellow. This man, who was from a lighter in the bay, had been, according to the most reliable information that could be obtained, engaged in removing ballast from the *Virtuoso*. He went in to the hold and threw it out through the port into the lighter. The thermometer averaged 78° for the previous five days. No other case occurred in the city, nor followed in the hospital until August, although the fever continued to prevail at quarantine station, 4 miles distant, across the bay.

"A German bark, the *Laura Maria*, entered port shortly after the *Virtuoso*. She was in a perfectly healthy condition at the time, but subsequently lost the greater part of her crew from yellow fever, having contracted the disease from being placed next to the *Virtuoso* in quarantine.

"On the 11th of August three negroes, who had been working at quarantine station, came over at night in a boat to this city, and one of the number, L. Thomas, who was sick at the time, died on the 13th of black vomit, according to the report of the attending physician.

"On the 16th, the American bark *Elmira Combs*, from Aspinwall, entered port with the majority of her crew suffering from Chagres fever, and was placed between the *Virtuoso* and the *Laura Maria*. A lighter, which had been employed in removing ballast from them, came directly from the latter, and lay alongside the *Elmira Combs*. She was only detained five days in quarantine, and then permitted to come to the city, where the greater part of her crew was discharged, who, putting up at Kelley's sailor boarding-house, went on a spree and were all taken down again that night or the next day. One of the crew was admitted to the hospital on the 22d, with a high fever, supposed to be Chagres, which resisted all efforts to break, and continued until

his death, on the 27th. The continuance of the fever, which quinine failed to check, the incessant vomiting during thirty-six hours, and the yellow discoloration which took place at the same time excited suspicion as to the real nature of the disease.

"Yellow fever was introduced here by vessels from Cuba, and was propagated and disseminated by a worthless quarantine and the sailors' boarding-houses. At the latter men were kept without medical attendance until it was of little avail; then sent to hospital at the very time when they should not have been moved."

With regard to the epidemic of yellow fever in 1875 at Fort Barrancas, 9 miles distant from Pensacola, I make the following quotations from the report of Dr. James S. Herron, published in the Report of the United States Marine Hospital Service for 1875. The history of this epidemic at Fort Barrancas affords strong evidence of the value of a properly conducted quarantine, since, although the disease raged violently at Barrancas, it nevertheless did not spread to Pensacola, nor even to the navy-yard, although the distance between this last and Barrancas was only 1 mile. Dr. Herron says:

"To the Supervising Surgeon-General:

"SIR: In answer to your letter, I have the honor to state that the Von Moltke arrived at this port from Havana on the 27th June, 1875, and anchored, during that night, a short distance inside the bar, between Forts Pickens and Barrancas. The pilot, Roach, landed to visit his home in Warrington, a village adjoining Barrancas, and remained there all night; but reboarded the Von Moltke the next morning, and, after taking her up to the quarantine station, returned again to Warrington, where, a few hours after, he was arrested and sent under guard to quarantine. The Von Moltke was reported by the quarantine physician as having arrived June 27 with five cases of yellow fever on board. One had died en route, and one, on June 28, with black vomit. On July 2 the *Guinare* arrived from Havana with one case of yellow fever; on July 12, three new cases occurred on board this vessel, and on the 15th one new case and two deaths. The fever broke out at Barrancas, 9 miles from Pensacola and 1 mile from the navy-yard, on the 18th of July, on which day there was one case; on the 19th there was another; on the 20th four, and on the 21st six new cases. At this date it was officially reported, and the well of the command stationed at Barrancas were moved across the bay to Fort Pickens, a measure which had been entirely successful in 1867, under General Seymour, and in 1873 under General Brannan; but which, on this occasion, proved too late, as the seeds of the disease were already implanted throughout the command, and their germination was both rapid and widespread. The fever did not extend to the navy-yard, between which and the Barrancas Commodore Cooper had posted a strong picket-guard, and maintained a close quarantine, nor to the city of Pensacola, from which communication was also cut off.

"The only way to explain the introduction of the fever at Barrancas is by reference to the above-mentioned facts, viz: That the Von Moltke lay, during the night of the 27th, off the post about three-quarters of a mile distant, with a strong southerly wind blowing directly from her towards and over Barrancas; that the pilot spent that night on shore, and was also ashore the next day at Warrington, which is only separated from Barrancas by an imaginary line, and with which, up to the outbreak of the fever, constant communication was maintained, night and day, as the post-office and all the stores are in the former place. That the fever appeared almost simultaneously in nearly every house in the garrison, would seem to favor the wind theory; but, on the other hand, if the disease was introduced by the pilot, the twenty-one days interval afforded ample time for a general dissemination and germination of the seed.

"The first case was Commissary-Sergeant Currell, whose position brought him in constant contact with all the officers and men of the command. He is said to have been intimate with the pilot and his family, and it is also alleged that he was a heavy drinker, and visited and procured liquor from the Von Moltke on the night of the 27th June. The visit to the vessel, however, is denied by the comrades of the deceased sergeant and also by the captain of the Von Moltke, in an affidavit sworn before Health-Officer Vanderpool in New York. In answer to a question which might naturally arise as to the exemption on this occasion of the people of Warrington from the disease, although the pilot landed and resided there, it should be stated that nearly all the villagers had already had the fever, it having been there as recently as the preceding year. Although the general outbreak at Barrancas in the summer of 1875 gives strong color to the wind theory, still, in this instance, as in all others which have come under my observation, and where the disease was alleged to have been carried any great distance over land or water by the breeze, a thorough investigation has traced its introduction to direct communication or to the importation of infected articles. It is the almost universal opinion here, that in order to make quarantine effectual and equal in their operations they should all be conducted by the Government and that disinfection by fumigation should be accorded a fair trial.

"The quarantine of 1875 was the most effectual we have ever had. It was conducted jointly by Commodore Cooper and the Pensacola board of health. An acting assistant surgeon of the United States Navy was detailed by the commodore as quarantine physician, and furnished with a marine guard. No case of fever came from the station. The epidemic at Barrancas must have been caused either by the anchoring of the Von Moltke near that post during an entire night, or by the visits of the pilot to Warrington."

In connection with the above, Dr. James S. Herron, in a report upon the epidemic of 1882, reverts to the epidemic of 1875 at the Barrancas, and, referring to the bark Von Moltke, he says:

"Pilot Roach landed from the fever-infected vessel Von Moltke on the 27th June and spent the night on shore, and was sent next day to quarantine station and there detained. The first case at Barrancas occurred on the 18th July, just twenty-one days later. This was Commissary-Sergeant Currell, whose position brought him in contact constantly with all the officers and men of the command; hence the seeds of the disease were gradually implanted, and their germination was rapid and widespread. Sergeant Currell was intimate with the pilot and his family, and the widow of the latter a few days ago informed me that the sergeant *always* spent his Sundays with them; hence the question as to how the fever was introduced into the garrison is settled, as the 27th June was Sunday, and Currell, therefore, positively came in contact with Roach, and with the coat of the captain of the Von Moltke, which Roach had borrowed to wear ashore."

"It is within my knowledge that the brother of the captain of the Von Moltke was the first person who sickened with yellow fever on board that vessel; he died on the morning of the 28th June, 1875, with black vomit. The captain made affidavit before me, that he had loaned his woollen overcoat to Pilot Roach, when the latter went ashore, and that there was no other communication between land and the Von Moltke. I was present at the interview between Mrs. Roach and Dr. Herron to which attention has been called above."

In his report of this year's epidemic Dr. Herron continues:

"In my 1875 report, to which reference has already been made, there occurs a mistake, to which you have kindly called my attention, and furnished me with the means of correcting by supplying the necessary data. I had in that report pronounced the 1875 quarantine an effectual one, saying, 'that no case of the yellow fever came from the station.' As you, doctor, were the physician who was, with the approbation of the city authorities and the consent of the Navy Department, that year in charge of our quarantine station, you are best qualified to know the facts, and from you I learn that a lighter belonging to one of the mills was, against your earnest protest, removed from quarantine by the then president of the board of health, who came to the station on a tug and towed her out; that subsequently a young man named Wilson was taken sick on her and died with black vomit; and that from this source the disease spread to a settlement on Yellow River, about 45 or 50 miles from Pensacola. I was at Barrancas at that time attending the officers of the garrison, and on my return to the city I was told the sickness was 'malarial fever.' Of the lighter and her connection with it I had never until now heard."

CONCLUSIONS AS TO THE OUTBREAK OF YELLOW FEVER AT PENSACOLA IN 1882.

The first portion of this report, containing as it does a carefully detailed history of the outbreak of the epidemic of yellow fever in Pensacola in 1882, which history is based upon documentary evidence of various kinds, to which reference is freely made, as well as upon the mortuary reports furnished, shows, beyond the possibility of cavil, that there existed no fever of any kind simulating yellow fever in the city of Pensacola until the arrival of the Spanish bark Saleta on July 22. The Saleta, it will be remembered, came from Matanzas to Pensacola Bay. On the voyage the cook sickened, his malady being reported as "cholera morbus." Of the accuracy of this diagnosis there was no means of judging. The Saleta brought a cargo from Antwerp for Havana and Matanzas, and it was whilst discharging said cargo at Havana, and before proceeding to Matanzas, that this cook, along with another man, was shipped.

I could obtain no particulars concerning these two men. After completing the discharge of the remainder of her cargo at Matanzas, the Saleta took on 200 tons of ballast at that place. This ballast consisted of rubbish.

She sailed from Matanzas on June 24, arriving at the Pensacola quarantine station on July 2. She lay there until the 17th, when she hauled alongside of the ballast crib and commenced discharging ballast. This operation continued until the 20th, inclusive. She was fumigated on the 21st July and released the next day, being permitted to go to the city of Pensacola.

It will thus be seen that this vessel was permitted to leave the quarantine station on the day following fumigation. The duration of the period of incubation of yellow fever being variously estimated by different authors, some question may arise with regard to the expediency of thus allowing ships to leave quarantine so soon after fumigation has been practiced.

Whilst on the subject of quarantine, it may be as well to state that several men either deserted or were stolen from different vessels lying at the quarantine station. This desertion was instigated by, or the abduction was the deed of, boarding-house runners from Pensacola, and such practice was indulged in both before and after the arrival of the Saleta at the station. The subsequent history of the men who thus disappeared from the quarantine was investigated, and, as far as could be ascertained, no evil results followed.

With regard to the general management of quarantine, it appears that no attention was paid, in a sanitary sense, to the wearing apparel and bedding of the officers and men of the different vessels lying at the station. My opinion is, had the ballast of the Iris been discharged at Ship Island, when that vessel was ordered there for the first time, the second outbreak of fever on board would not have occurred.

In connection with the danger to be apprehended from ballast, I may be permitted here to refer again to the report of Dr. James S. Herron on yellow fever at Pensacola in 1874. Dr. Herron relates the case of a man employed on a lighter in the bay, who died of yellow fever on May 30. He had been engaged in removing ballast from the bark *Virtuoso*, which had arrived from Havana. "He went into the hold and threw it (the ballast) out through the port into the lighter. * * * No other case occurred in the city, nor followed in the hospital until August, although the fever continued to prevail at quarantine station." The first persons who contracted yellow fever in 1875 were employed on board the *Von Moltke*, which arrived from Havana. There were six cases, one of which terminated fatally *en route*, and all these six men had been down in the hold working in the ballast.

The *Gulnare* also arrived at the station, from Havana, with one case of fever aboard. This man had been employed for one or two days in the hold. After her arrival, on ordering the ballast to be broken out, three new cases developed. In 1875, whilst I was quarantine physician at Pensacola, two ballast lighters were forcibly taken away from the station and removed to a point across the bay. Yellow fever subsequently made its appearance from this source of infection in the neighborhood to which the lighters had been removed. These lighters had been employed in discharging the *Von Moltke* and *Gulnare*.

The foregoing facts came under my own observation. The practice at the quarantine station in 1882 has been to dump all the ballast at one spot or crib. In consequence of which there stands at this point a large mound or miniature island, which rises to a height of several feet above the level of the water. Whilst there is no conclusive evidence that the first person reported sick on board the Saleta, viz, Carlos Y. Garturo, was attacked with yellow fever, still from the history of his symptoms furnished by Lopez and Salcedo, both of whom saw him, and stated that he sickened within a day or two after beginning to work in the ballast, and also in the light of subsequent events on board that vessel, it is by no means improbable that Garturo really had yellow fever. It will be remembered that the Saleta discharged all her ballast at the quarantine station, with the exception of 45 tons with which she came up to the city. This remaining ballast lay amidships until July 28, when it was removed to the after part of the ship, immediately under the cabin where the officers sleep. Cariaga was the first mate of the Saleta, and his duties compelled him to visit the hold; he slept in the cabin, and contracted yellow fever between the 3d and 6th of August. There were two other cases of yellow fever on board the Saleta. The first of these occurred in the person of a seaman, between August 4 and 7, and the second victim was the cabin boy, who sickened August 8. Captain Bartoro, of the Italian bark *Vincento Accame* was stricken on the 6th of August. He evidently contracted the disease from Cariaga, with whom he had been associating when Cariaga was complaining of being ill.

Dominico and Lorenzo Rossario sickened on August 9, and their mother two days later. It will be remembered that this family had laundried Captain Bartoro's clothes, but that these had been returned to him on or before the outbreak of his illness. A much more plausible explanation of the infection of these people is furnished by Frank Dool, who constantly visited both Captain Bartoro during his illness, and the Rossario family.

Mr. Gallo, a tailor, whose shop was situated one door east of the Rossario premises, sickened August 13.

On August 16 Mr. Duke took sick. He was a fisherman, and his boat lay alongside of the Saleta and ahead of that vessel at the same wharf. He also passed daily before the Rossario residence.

There were three cases on August 17, two of which, Guisippi Ferri and Giovanni del Medico, can be traced directly to the Rossario family and to Frank Dool.

Mr. Emanuel Reta, the third case (on August 17), attended Captain Bartoro's funeral. The Italian bark Galileo S. sailed from Pensacola on August 17. Her captain and three men had attended the funeral of Captain Bartoro. She was subsequently reported as having had yellow fever on board during the outward voyage. There occurred a case on the 18th, Ferdinand Marjori, and another on the 19th, Salvatore Giardino, both of which are traceable to visits paid to the Rossario house and to that of Dool. Marjori and Giardino also attended Dominico Rossario's funeral. Three vessels, the Italian barks, the Rosa B., D'un Amico Ligari, and the American bark Annie Reed, left Pensacola August 19. The first two put back to Pensacola with yellow fever on board, and the last was reported from the New York quarantine as having had yellow fever on board during the outward voyage. The captain and three men from both Italian vessels had attended Captain Bartoro's funeral. The Annie Reed had shipped a portion of her crew from a house adjoining that of Frank Dool, in which yellow fever had been prevailing.

Mr. N. S. Cobb was the next case, and he sickened August 21. His workshop was 51 feet distant from the Rossario yard. Mary Hobson also took sick August 21. She was in the habit of passing the Rossario residence and visiting the Catholic Church, from which there had been yellow-fever funerals. There had also been cases of the fever within 50 yards of her domicile.

On August 22 the mate and two seamen sickened on board the Vincenzo Accame (Captain Bartoro's vessel).

Mrs. Hargis also was attacked on August 22. Her husband, Dr. R. B. S. Hargis, president of the board of health, was in daily contact with yellow fever patients.

There were four cases on August 23:

- (1.) Mr. Carter, who was living with relatives who had been working on board the shipping, and who had been frequenting the wharves at which the vessels lay.
- (2.) Mrs. N. S. Cobb, who evidently contracted the disease from her husband.
- (3.) Mr. J. F. McConnaughy, express agent. He had been receiving and handling freight from various parts of the city, and he was in the habit of passing the Cobb and Rossario houses daily, and his place of business was situated within a few doors of the Catholic church.

- (4.) Miss Slocomb, who contracted the fever from Mary Hobson.

August 24, three cases:

- (1.) Miss Carroll, who went to and received a package from the express office, and who was compelled to pass by several houses in which there was yellow fever. She was also daily visited by a clergyman who had been attending the sick and burying the dead.

- (2.) Mrs. Sinkler; Mrs. Cobb had paid her a visit, and her house was distant 51 feet from that of Rossario's.

- (3.) Salvatore Pirale, who contracted the fever from visiting the residence of Rossario and Frank Dool, in both of which yellow fever had been prevailing.

August 25, two cases:

- (1.) Mrs. Duke, whose stepson was convalescent of yellow fever in her house.
- (2.) Mr. Shirmer; he had been lying around the wharves several days, and he had living with him one Louis Benner, a drayman, who visited the Cobb house daily.

August 26, four cases:

- (1.) Juan Farina; he lived in the same house with Marjour, who was at the time sick with yellow fever; he had also been visiting Frank Dool and Rossario.

- (2 and 3.) Mother and child, names unknown. They lived next door to Frank Dool's.

- (4.) The second mate of the English bark Cambay, which vessel was lying close to the Vincenzo Accame. This mate had also visited the wharves.

August 27, four cases:

- (1.) Carl Forbeck, who was living in the Shirmer house, in which Mr. Shirmer himself had the fever.

- (2.) Louis Bennel, the drayman mentioned above, who had been visiting the Cobb house daily, and who also lived under the same roof with Shirmer.

- (3 and 4.) Mr. Carter and Mr. J. M. Graham, who must both have contracted the disease from J. F. McConnaughy, as they both lived in the building of which one portion was used as the express office, this being separated by a thin partition only from the other half, which was occupied as a grocery store.

August 28, eight cases:

- (1.) Two-year-old child of Mr. Hughes, in the neighborhood of whose store there were several cases of the fever.

- (2.) William Herrz, seaman, who lived next door to Frank Dool.

- (3.) Mate of the ship Karnak. He came ashore daily, visiting the wharves, and was subject to the general epidemic influence.

- (4.) A seaman on the bark Penang, which vessel was lying at the same berth that the Saleta had occupied. He had also passed in front of the Cobb and Rossario houses.

(5.) Mrs. Dunbar, whose house yellow-fever funerals daily passed, and whose husband was employed at the mill near the Rossario and Cobb residences.

(6.) Wm. G. Bush, hospital steward for Dr. Fordham, who was in contact with the sick every day. This steward had also passed by the Cobb and Rossario houses.

(7.) Josephine Cherry. Miss Carroll was lying sick in a house diagonally opposite; funerals passed the door daily.

(8.) Farina, brother to Juan Farina above, and residing in the same house.

August 30, three cases:

(1.) Joseph Merlin. His residence was diagonally opposite the Catholic church; he had been visited and patronized by parties from the express office, Graham's grocery, and he had also visited those places in return.

(2.) Charlie Bell Perry. Several cases had occurred in the neighborhood in which her father kept a grocery store.

(3.) Wm. Burton (colored), a hack driver, employed at a stable situated three doors from the Rossario house; he had been driving to funerals.

Besides the above list of cases which form an unbroken chain, I have been informed of others in a more or less vague manner.

The knowledge which I have thus acquired is not, however, sufficiently definite to warrant me in making particular mention of such cases here. I content myself with reporting such other instances of fever for what they may be worth.

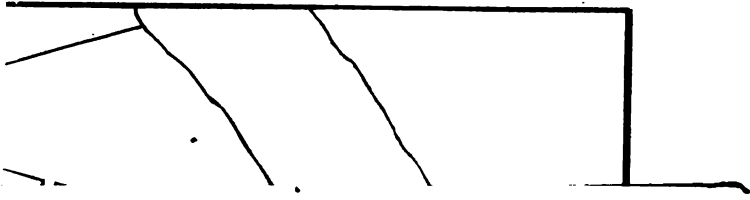
From all that precedes, it appears to me, that there can be but one conclusion arrived at with regard to the introduction of yellow fever into Pensacola last summer; that conclusion being that the infection of the city was brought about by the Spanish bark Saleta.

After the disease had once gained a foothold, it was, for a relatively speaking lengthy period, confined within a certain area, which was bounded by Palafox street, on the west; Intendencia, on the north; Alcaniz, on the east; and the bay, on the south. There were but few exceptions to this general rule; these being the cases of Captain Bartoro, Gallo, Mr. Duke, and those which occurred in Frank Dool's house. In the district whose boundaries have just been mentioned are situated the Catholic church, the express office, and Graham's grocery store; in fact it may be styled the business portion of the city.

The Catholic church opened its portals for numerous funerals; the express office continued delivering parcels of freight although for a time its inmates were sick of fever within its walls, and Mr. Graham's store was kept open for the transaction of business. These different places of resort being situated in the heart of the city, were a constant menace to the entire population, even to those who resided outside of the limits of the infected district, but whose business, or necessities required their presence in this plague-stricken locality. The testimony which has been adduced in the course of this report goes to show that the fever spread along the route usually followed by those funeral processions at which service was performed at the Catholic church; this route lay through Government street to Alcaniz and thence to the cemetery.

It is deeply to be regretted that the first cases of yellow fever were not recognized, or, at least, that there existed some difference of opinion in regard to their nature among the gentlemen comprising the board of health. The consequence was that public funerals were allowed—although in the case of Captain Bartoro, this took place in opposition to the judgment of Dr. R. B. S. Hargis, president of the board of health—and it would appear that these public funerals assisted materially in the dissemination of the fever.

Isolation and other sanitary precautions were omitted in the first cases of the disease. This was due to the difference of opinion alluded to above.







APPENDIX.

THE PENSACOLA YELLOW-FEVER EPIDEMIC OF 1882.

By Dr. R. B. S. HARGIS.

The illustrious Newton laid down the maxim in his *Principia* that no more causes of natural things ought to be admitted than such as are both true and sufficient to explain the phenomena. Whoever should attempt to deduce from reports issued for over a century on the nature and origin of yellow fever a just and useful guide in averting and controlling its outbreaks, needs not only a large amount of medical sense, but a knowledge of history and the language of medicine at different epochs possessed by few.

The criticism is not new that "such is the love of mankind for the marvelous that the most obvious causes of natural phenomena are disregarded, and their explanation sought after by resorting to such as are hypothetical and remote or obscure." Medical records fail in conveying the truth more frequently by the assumptions stated as facts than perhaps from any other defect. This is notably the case in relation to epidemics of yellow fever. The work of La Roche affords a good illustration of every supposition being sustained by so-called facts.

With the advance of medicine and the introduction of positive methods borrowed from physical investigations clouds are disappearing. But, unhappily, there are still schools stronger in their assertions than in genuine data whose verbose theses closed the understanding and mislead the world. The history of yellow fever never has been written, and it is doubtful whether the herculean task ever can be successfully accomplished unless it be by some wealthy medical observer of uncommon erudition and research, whose years of leisure and ample means may be devoted to it. When written its necessarily bulky volumes would be apt to remain in the publisher's hands and the reward for much self-denial would simply be the consciousness of sound service rendered to humanity.

We are therefore compelled to deal with the subject in a fragmentary manner, insisting on the lesson taught by recurring epidemics, and trusting to progressive enlightenment coincident with and due to the slow but sure advance in the science of medicine.

It is impossible for an observer of thirty or forty years' standing not to have noticed that the distribution and recurrence of yellow fever have been materially restricted by causes unforeseen, and, indeed, beyond the reach of pure medical perception.

Commercial, political, and maritime progress have fortunately tended to limit rather than extend the range of yellow fever. In America, from the time that Boston first fostered the West India trade, and necessarily harbored this pestilence, New York and Philadelphia have been decimated in times of unusual intercourse with equatorial parts—due to conflicts, massacres, and raids—such as we may safely predict cannot recur.

With the extension and improved construction of wharves and buildings, the introduction of steamships to supersede the crazy and oft rotten craft trading with the tropics, and last, but not least, the better system of quarantine have combined to rid the principal ports of our Atlantic coast from any possible yellow fever invasions.

The abolition of the slave traffic, the improved system of navigation which the world owes in so large a measure to Commodore Maury, and the sanitary precautions, slowly but almost universally adopted by the navies of the world for all vessels visiting the tropical Atlantic, have resulted in an immense reduction in the gross annual mortality from yellow fever.

Experience teaches, however, that special sanitary precautions are indispensable in tropical and semi-tropical Atlantic ports where heat and moisture prevail during the greater part of the year, so as to favor the extension of this disease when once introduced. We cannot, in the Gulf of Mexico, rely on adventitious influences tending to the probable and possible extinction of yellow fever. The foul vessel will touch our shores and inflict untold loss and suffering on defenseless people. It is here that sound medical sense and sound sanitary regulations can alone serve. The numerous instances of immunity would indicate that prevention is comparatively easy; but, on the other hand, the lesson is taught us that in an unguarded moment a trivial indiscretion or unintentional wrong-doing may plunge a community into misery and mourning.

Each and every epidemic since the first I witnessed over forty years ago convinced me that if sanitation had ranked as a science in the true sense of the term, the return of yellow-fever epidemics and their probable location would have been anticipated and special precautions taken with every change in the current of human intercourse and commerce.

The noble Escambia floats to our bay immense rafts of timber. Felled in summer, cargoes were ready for shipment in the autumn and fall. Our wharves, crowded with old British and Dutch sailing vessels, became at this period human beehives. Square ports were opened in the bows and the timber stowed with the least labor. Not unfrequently the vessels were barely seaworthy. Insurance made the owner indifferent of ocean risks, and as for the sailors' lives on a water-logged derelict, no one heeded them.

And here I may state that a leaky vessel is not usually a yellow-fever carrier. A foul bilge capable of engendering disease is by no means likely when pumps have to be worked from port to port.

Steamers drove the old British and Scandinavian hulks from the oriental and other centers of commerce and forced them on us. Their wrecks are strewn over the entire ocean line from Pensacola to Liverpool. But, strange to say, that during the past five or six years the British and Scandinavian bottoms, interspersed chiefly with Spanish, have been superseded by a still worse type.

The Scandinavian vessels are mostly of British construction, and though built and navigated in utter defiance of marine hygiene they are solidly built of good material, and have their forecabin and cabin on deck. In the majority of cases the air space is sufficient, especially on the vessels sailing under British laws. The food allowed the crews is wholesome and abundant, and the medical stores so good that I frequently resort to a *bona fide* British medicine chest for some special drug. As years have advanced there has been less necessity for this, but Northern medical men know little of what physicians isolated in a city without railroad communications, and ruined by the war, have had to do to secure for their patients essentials in critical cases. In the year 1876 was inaugurated a new order of things as regards the shipping. Prior to that time an Italian flag was rarely seen in Pensacola Bay. They gradually grew more numerous and arrived earlier than other ships. As if to prove the relative salubrity of the Mediterranean and Black Seas, where yellow fever never originates, their construction is totally unsuited to the equatorial Atlantic. Their forecabin and cabin are under deck. The air space and ventilation totally inadequate, and in many instances the forecabin is a gloomy dungeon, where all is invisible without candle light. Clyde-built and North of England steamers, and some large iron and wooden sailing ships sailed from British ports to capture the Baltic grain trade. All great changes are effected slowly, and it took some years to drive the Italians from entering the Bosphorus. They then turned their attention to the lumber trade, most unfortunately for our Gulf ports. They now amount to nearly, if not more, than one-third of the ships whose flags we see flying during the most threatening months for yellow-fever invasion. They carry coals from Great Britain to South Africa, South America, the Azores, and West Indian Islands. They then proceed in ballast to Pensacola, and export pitch pine to England and other countries.

The seamen are ill-fed, ill-paid, and always dirty; such a vessel never can be safe in the calm belts from pestiferous emanations, and I am utterly astonished when I enter such a vessel, reeking with numerous conflicting odors of the most poisonous and nauseous type, that any human being can doubt the pernicious tendency of such conditions, specific as they must be in certain Atlantic latitudes.

With a free surface to the air, a marsh develops malarial poison. How much more deadly, especially since Pasteur's researches have enlightened us on the effects of oxygenation on virulent matter, will this fouling of holds, deprived of oxygen so that lights go out in the well and elsewhere, induce a malady unlike anything else we know of except in the mountain of records of Atlantic traffic and Atlantic ports. I desire to adhere as strictly as possible to the facts which a broad view of the recent epidemic unfolds to me, and have no patience with assumptions defacing the great truths of history. A veritable craze has arisen, which almost instinctively excites derision in the believers of a yellow fever poison originating within the human system.

New ships by the thousand, of superb British construction—in thousands of cases absolutely new—have, since 1860, buried their victims on the way from British ports, without yellow-fever infection, to Calcutta and Bombay, surely guarded by the influence of Antarctic Ocean currents which gave to the equatorial Atlantic the fatal pre-eminence of a special ocean infection.

Yellow-fever reporters who give their ink full flow have not yet learned that "the only test of physical reality is sensible experience," and that the grand facts of history are somewhat of more importance than the metaphysical assumption of human influence in engendering this disease. And what has done more than all else to extinguish the yellow fever except in the vile ports of the tropical latitudes? It has been the science of navigation, speeding vessels through the calms, and steam bearing us almost scatheless as it does everywhere.

Of course, such considerations are wild to the man who assumes that which he cannot establish on a single verified datum. We challenge them to produce it. But it is evident from the recent epidemics that the trade of Pensacola is a special source of danger, for the moment, to the Gulf, owing to the foul lumber ships. On the other hand, railroads have reached us and are going from us.

The second great influence accounting for the Pensacola epidemic of 1882 is the vast number of poor, unprotected people. I took good care at the earliest moment to influence all I could to depart, but, no, the tendency was to prolong quarantine, about which more anon. It was not a warning, that I ordered a ship to set sail, without daring to perform a post-mortem lest I should arouse the indignation of the whole town.

When I ordered a private funeral and disinfection and the interdiction of the following to the cemetery by the friends of the deceased, I was told it was unwise and calculated to create a panic. The ship I ordered to quarantine dreaded detention and sailed for Havana, losing two of her crew on the brief passage. The more prominent the position of a yellow-fever physician in local sanitary councils, the more guarded must his words be; and until the evidence, pure and simple, of the case of Mrs. Cobb, my friends acted on my profound belief, and the untutored, still resting their fancies on local origin, denounced me in unmeasured terms.

The history of every epidemic must be frank and truthful. I cast reflections on no one, but had the city not been so long healthy; had the railroad traffic not developed horror at the very mention of a word which would hem us all in; had the ruin apprehended by our best citizens not forced them to scout advice, isolation and limitation of the epidemic would, even with our slender means and absolutely inadequate appliances, have perhaps been more successful. They indeed were well-nigh futile, and all we could do was to limit the mortality.

Third. The type of the disease most naturally influenced its spread.

With a common concert of opinion, it has been so long insisted on that yellow fever is never infectious from the sick to the healthy, because events of the kind seemed to be rarer and rarer in the past, has led me to be very guarded. No fact substantiates or indicates the remotest tendency to inoculability. We have had evidence of wounded soldiers and marines in hospitals doing as Napoleon did in Egypt. It is not my business, however, to do more than insist on the evidence furnished by the late Pensacola epidemic.

No series of observations brought more clearly to my mind the evil effects of dogmatic assertions. None of us doubted the protective influence of one attack, though double cases have been recorded. The recognition of this great rule gave a sense of security to the inhabitants of tropical and inter-tropical ports.

Nothing will tend more to stimulate inland quarantine and destroy our commerce than the absolute facts, of course denied by those who said it *could* not be, viz, we were wrong in our diagnosis. Local malarial fever, and not yellow fever, was raging. My practice taught me, first, on leaving an infected ship I carried the disease in a severe form to my wife, who communicated it to my youngest child, Virginia, five years old, and the only one born since the last epidemic. My second daughter, who was severely attacked in 1873, took the disease in a very severe form. My eldest son, Robert, thirty-five years of age, who had had the fever in 1873, and has passed as a druggist through every epidemic since, was smitten. My sister, beyond middle life, likewise protected, according to all our views, fell sick. My fourth daughter, who had the disease severely as a baby in arms in 1878, was reduced nearly to a moribund condition whilst lying very sick for seven days.

The data appended substantiate the startling misfortunes which early and quickly afflicted my household. I announced publicly that I could not attend labor cases, and cautioned every person who insisted that I should visit his house in other forms of disease which demand immediate attention. In this way, and in spite of every precaution possible, I communicated the malady to at least one family, fortunately, however, without fatal result, though one individual had black vomit and hemorrhage.

The obvious tendency to indiscriminate advance led me to exceedingly stringent precautions around our city to prevent refugees communicating the disease. The skill and vigor of Surgeon Alfred M. Owens in protecting the navy-yard reservation had to be called in full play. Our piney woods and scattered settlements offered points too few to warrant encircling the city by a multitude of negroes for some fancied protection of the world outside. The very suggestion of such a proposition indicates what utterly futile and senseless measures may be advocated even by the wisest in ignorance of definite and local conditions.

Island communication, since our last epidemic in 1874, has evidently become to us a menace and a safeguard in this respect—a menace, because it makes the timorous conceal; a safeguard, for it closes the door to future danger when a few cases force the unwelcome truth of an impending epidemic to be accepted.

I have taken pains to trace the means whereby Montgomery was infected by goods from Pensacola in 1873. Non-intercourse had better catch us early and depart than

delay and deny us the privilege of a healthy city, if a few first cases prove to have left no elements of unlimited propagation. In this respect the epidemic in Pensacola the past season is of importance had there been no hesitation in boldly dealing with the first few cases even as suspicious; frankness would have rewarded, for all interests would have lent important aid when it would have been most effective. Had the Gulf States a sanitary council, a competent committee might have settled vexed questions in a couple of days, and by candid methods and skill have saved us from untold hardships and recrimination. Who can doubt that the presence in New Orleans of representatives of the National Board of Health and the activity of the officers of the Auxiliary Sanitary Association combined with the State board of health to save the city from an epidemic? All was ripe for it, and every case that occurred was disputed.

It must not be supposed, however, that I approve of basing isolation on removal of patients and their almost certain death. The communicability to some extent of a peculiar type of the disease, pronounced as it was with us last season, indicates that when a sailor must be dragged out of his pestilential ship he should, in any of our ports, enjoy every means that art can suggest for his comfort. At certain stages the mere standing up a patient, or roughly lifting of the head, kills when all the organs are found in fair condition, so profound is the impairment of cerebral nutrition. Are we justified not to make provisions against killing the innocent victims? The stout young men stricken with fever and moved to the charity hospital last summer all died, whereas my mortality in Pensacola did not reach 5 per cent. I beg leave to suggest that a special marine ambulance be designed, with a regular bed to be moved so that once in it no more lifting and walking has to be performed. Such an ambulance should be provided with the best appliance for smoothly raising such bed on deck and close to the fore-castle or cabin, if it can be run in on wheels. Four men with a stout sheet and a pair of rods to stiffen the edges can transfer a man horizontally with the greatest ease, and precaution must be taken to avoid anything approaching a vertical lift. The patient, as is common in yellow fever, will say that he can walk to the cot, but the responsibility of that man's life is then on those who, having the means to save him from his rashness, if they fail to do it.

Close to our quarantine, if not in it, a neat hospital should receive such cases, so that the ambulance delivering the bed from water to land would smoothly place it in the ward. So few witness the cruel hardships inflicted on sailors, the rough words with which they are called out of their bunks, and the shiftness of all under such an emergency, that my suggestion may sound too refined even for our present views. I trust this is not so.

I will recite a case: On the 23d October the wife of the captain of the Swedish bark Emma was visited by me and found suffering from yellow fever. This lady had every comfort in the cabin, was well nursed, and made a good recovery. But when the disease struck the fore-castle, on the 1st November, it was deemed desirable to prevent spread and fumigate the vessel. In order to do this the sick sailor had to be removed. Awkwardly raised, he had to be lowered into a boat, in the bottom of which he was laid, but it requires no stretch of the imagination to understand the rough-and-tumble process of such an operation, however humane might be the attendants. On reaching the wharf he had to be moved three blocks, where he certainly found comfortable quarters, was skillfully attended by Dr. Edward W. Jones, the Times-Democrat physician, during my temporary indisposition, but on the fifth day of his illness he died.

Dr. Jones likewise attended with me the captain's wife, so that we have in these two cases a striking contrast to indicate the well-known and serious risk attending any removals of yellow-fever patients.

CHARACTERISTIC SYMPTOMS OF THE EPIDEMIC OF 1882.

It is admitted that when a physician is first called, especially during the period of invasion, to attend a case of any form of fever, it may take a day or two, and even more, to develop characteristics, manifestations, eruptions, &c. The type of yellow fever we have had last season was most markedly distinguished by the absence of any icteroid appearance of the skin in nine-tenths of the cases. The hope that it might prove mild in the whites was not sustained, but the colored race took it with most exceptional readiness and mildness. The pulse in the majority of cases was noticeable for its slowness as compared with previous observations. The fatality was, as usual, greatest among strangers who had not resided long enough in the city for the system to undergo that slow process of accommodation to climatic conditions in the South which renders the blood and tissues less liable to undergo any active retrograde metamorphosis in the diseases of hot climates. It is the intensity of energy's full measure of internal calorification that seems to bear a direct ratio to the intensity of fever and the suppression of secretion, so quickly fatal.

It is quite a mistake to suppose that the cases we were called on so recently to attend were as a rule devoid of danger. The mild cases began with a slight chill and

languor, followed by fever, with tolerable pains in the head and back. The face was commonly flushed, with a languid expression, and the conjunctivæ more or less congested and red. There was more or less drowsiness, especially in children and the negro. The temperature, rising promptly at 102°, would remain stationary, and the pulse would likewise attain 105° per minute. Then comes what I would call the apyrexial stage, when the pulse sinks to the normal, and continues sinking. This is the calm stage, when the patient feels all right and wants to get up, but the physician must not be deceived or he loses his patient.

The pulse may be two beats below the normal, or even lower, and with a restlessness, or, as I call it, "creepiness," experienced. These symptoms are absolutely diagnostic. The poison has expended its power, the tissues are wasting, fatty change is rapid and systemic, and the process of repair characterizes the third stage of the disease. However mild a case may be, the attendant physician must always watch the nervous phenomena, for where least expected a predominance of restlessness, jactitation, convulsive movements, or general convulsions may supervene. In my experience a general convulsion has resulted always in death.

The *severe* type of yellow fever is indicated by an exaggerated manifestation of symptoms in the apyrexial stage *only*, unless its natural tendency later was interfered with by improper treatment, removal, or some imprudence on the part of the patient. The onset is more frequently sudden than in the mild; nausea and vomiting pronounced; the headache intense and extending to the occipital region; more or less delirium; severe rachialgia, prompt elevation of temperature to 103.5° Fahr., or even 104°; pulse 110 to 116 per minute. Under appropriate treatment, in a fair case, after the first twelve hours both pulse and temperature recede. In others the pulse recedes but little, and may rise. The restlessness is great, and a profound stupor, with supervening convulsions, proves quickly fatal.

In other forms the nausea continues the predominant feature; the blood-oozing, especially on the gums, is marked; signs of dark blood on the handkerchief invite suspicion; black vomit, and commonly, though not always, death follows.

It is not my intention to write a treatise on yellow fever, and I therefore simply indicate to my professional brethren the typical signs of our last epidemic.

TREATMENT OF YELLOW FEVER.

The conviction has grown on me with time that none of the continued fevers can be treated with more satisfaction than yellow fever. All are agreed that patient and skillful nursing is a prime essential, but, unlike variola, typhus, typhoid, scarlatina, diphtheria, &c., we can watch and avert complications, which is ever encouraging to the yellow-fever physician. I enter my protest against either the "expectant" or the "specific" treatment. By "specific" I refer to such an antidote as quinine is in intermittent. By the "expectant" we mean awaiting developments and then prescribing according to symptoms. In the treatment of yellow fever the physician must never await developments. In all but suddenly fatal cases, without unusual premonition, we know for the first seven days pretty well what to expect. *As a rule*, beyond this period the patient becomes an ordinary convalescent and can take what would kill him before. Perhaps ranking the nurse is the question of keeping each patient by himself. Any emotional excitement may kill, and scenes of anguish raise the mortality 50 per cent. Wards are not suited to the treatment of this disease. At all events, beds must be far apart, and should be away from corners and walls, where yellow-fever atmosphere is apt to lodge and poison a patient in the act of recovering. For our quarantines the cottage hospital system is the best, with every sanitary convenience, and all pleasant surroundings should be attended to. Perfect ventilation and plenty of ice and water are as necessary as the best food and medicine. Comfort and congenial treatment inspire hope, and when hope is lost the first nail is driven in the coffin. On the whole we were much better situated during the last epidemic than any other.

The condition of the people is improved, our houses are loftier, business has been good, an ice factory has been established, which conferred an inestimable boon, and there was no lack of supply, nor the remotest tendency to raising the price to "corner" the suffering city. All these influences told their tale, and one who has known what it was before can testify. Reduction of mortality may, on the whole, be relied on under the most favorable conditions of a city for health and good food and medical supplies. The observation seems trite, but I do not feel justified to overlook an important factor bearing on the explanation of an apparent anomaly.

When double cases succeed each other in quick succession, "Oh!" they exclaim, "this cannot be yellow fever." And others far and wide believe to this day that not one of spurious cases swelled our lists and reduced the apparent mortality.

Now, I claim to know intermittents, and did not fail to see them early in the season. I dealt unsparingly in doses of quinine; and here, by way of parenthesis, I put in my word for "freedom of trade in quinine." It is only recently I heard of the attempt to

renew a tax on a commodity that on every planter's mantel-shelf should be as plentiful as salt. We don't fear pure quinine in the South, but we do fear imitations, which I have unwittingly used until driven to a British vessel, where I could rely on the genuine article, and saved my patients with doses as high as sixty grains. All Americans should protest against a tax on a necessity of life in the South.

I was prescribing quinine daily in my practice in June and July, when suddenly periodicity vanished. The ominous signs of the coming enemy enlightened me. The antagonism of malarial and yellow fevers, on which I have before insisted, came out in bold relief. Patients I had attended early in the season for malaria sought me for a seven-day attack of yellow fever. Cases of severe malaria yielded in a single day, and a man who had been constantly getting chills would recover from an attack of the epidemic and feel better than he had done for years. I do not dare to offer explanations; I vouch for the facts. No sooner did I perceive the current of events than I gave quinine most cautiously. With any case of yellow fever it is right to begin with a hot pediluvium and hot diaphoretic infusions. A light but warm bed-clothing is indispensable, since the skin is extremely sensitive to cold. With contraction of the cutaneous capillaries internal complications may be anticipated. A patient must not be suffocated and sweated to death, but a gentle action of the skin is a sign of moderate fever heat. Without much delay the large intestine must be cleared by a dose of oil. It is that the physician must recall the fact if he has any experience, or be regulated by one injunction, viz, to watch for the slightest indication and act promptly. He must not let his patient suffer from thirst, and iced water or cracked ice affords greatest relief in great moderation. The killing torture of thirst must not be permitted, though with a very sensitive stomach, in the early stage, it may be desirable to give nothing but by the rectum, and, by appeasing the stomach, avert black vomit. We have to watch symptoms, but under no conditions must the sufferings be soothed by opium or its derivatives. There are exceptions to every rule, but fewer to this than any other I know of. To me the calm or apyrexial stage is the cause of the most anxious solicitude. The slightest indiscretion of the patient, friend, or nurses may thwart every medical endeavor. The creepiness and irresistible desire to arise must be allayed, and I have one prescription on which I rely with full and matured confidence. I prescribe 35 grains of the potassium bromide with from 5 to 10 drops of fluid extract of gelsemium, in some agreeable menstruum, such as cinnamon water, with a little sirup, orange tincture, or tolu, to be administered every hour or two, as may be found necessary to quiet the patient and insure calm repose. It must be repeated every hour or two, if necessary. Should the stomach refuse the dose, it must be given by the rectum in a triple dose. Vomiting in yellow fever is more often provoked by what may be taken into the stomach, even if simple water, than from any natural inclination, and it may be relieved by a total abstinence from anything for 12 or 15 hours. The dose of the bromide and gelsemium for an adult by enema is one drachm and a half of the first with 20 or 30 drops of the second. Yellow-fever patients can often receive medicine and nourishment by the rectum when it cannot be taken by the mouth. To strengthen a weak pulse, when associated with general weakness and apparent prostration of the vital forces, nothing is equal to digitalis given hypodermically, in 15-drop doses of the tincture every two or three hours, as long as may be necessary. This has in my practice often "brought the pulse out" when it could not be felt at the wrist, and as a result the patient was probably saved. When the bloodless state is marked, and a hemorrhagic case presents the features of a pure anemia, the chloride of iron, well diluted, by the mouth, is perhaps the safest blood renewer, and it may also be given hypodermically. Fresh wine jelly, delicate food in minute quantities, and in fact very digestible sustenance should be given whenever tolerated. This imposes watchfulness on the physician. A case of yellow fever is soon over, but while it lasts the attending physician should be unceasingly vigilant. The time for mild stimulants arrives, and the difficulty of keeping the patient in bed till after the seventh day should never escape attention. When in the course of the disease the bowels have not been moved for twenty-four or thirty-six hours, and it is deemed desirable to prevent continued inaction, two grains of calomel triturated with several parts of refined sugar and chalk may be sprinkled on the tongue every two hours and swallowed with water. This usually affords marked relief. The number of cases I had under treatment from first to last was 432, of which 53 were amongst the negroes. The deaths were 18, all amongst the whites. Of the fatal cases, 6 were of intemperate habits; 4 of the mild cases in the early stage of the epidemic died from imprudences. One of them, however, may be ascribed to the painful emotions of a sick mother seeing a convulsed child; the latter subsequently recovered.

WHAT SHIP INFECTED PENSACOLA?

In order now to indicate the special lesson of our last epidemic, with a view to the easier prevention of future outbreaks, a brief statement of the earliest manifestations and the connection of special vessels with the first cases may prove instructive,

and it is with much pleasure I acknowledge the industry and intelligence manifested by Dr. William Martin, assistant surgeon, U. S. N., who rapidly gathered, at a time when all trace might have been lost, evidence of great value, and on which I have had in part to rely.

On the 9th day of August I was requested by Dr. J. S. Herron to visit the Spanish bark *Saleta*. There were three sick men on board; one moribund, without fever, with the complexion of chronic malarial cachexia, pulse about 60, and respiration 24; had been sick three days. The second case, also free from fever, offered to rise, with the aid of his shipmate, but was prevented; had an apparent normal pulse, but was very weak; the countenance was sallow. The third and worst case in the cabin had been sick ten hours; had a pulse at 108, eyes red and watery, skin of rather a reddish dusky hue. Tried to get some urine, but failed in all three cases. After this Dr. Herron gave his directions, and we agreed to meet at 9 next morning, but I was delayed by an unexpected call to a sick child, and received a note from Dr. Herron to the effect that he had been on board, that the mate was dead, and desiring to see me. We agreed that the disease was yellow fever, but desired to have the benefit of a post-mortem. I went immediately to the office of the board of health and directed that the vessel should be taken to quarantine at once.

We had not long to wait before learning that the captain, anxiously avoiding quarantine, had set sail for Havana. I had not the remotest idea that the captain of the *Saleta* would leave port and risk a voyage. I was deprived the opportunity of verifying my diagnosis. So many doubts were expressed as to the correctness of the diagnosis in the *Saleta* that I had to await events.

In the afternoon of August 11 I was requested by Dr. Bouvier, a most pains-taking and skillful French physician in Pensacola, to visit Captain Bartoro, of the Italian bark *Vincenzo Accame*, sick at the residence of Mrs. O'Neal, on Intendencia street, two blocks and a half west of Palafox street. I found the captain at stool, with a man in attendance as nurse. He soon got into bed again, with aid, but was very weak, so that we wanted to secure his repose and a better observation of the symptoms. I learned from Dr. Bouvier that the captain was taken sick on the 6th of August, was brought ashore, and carried on a stretcher to his lodging. We found his pulse 100°, temperature 99°, respiration 22, skin soft, tongue slightly coated. He had no thirst, no nausea, some listlessness, but his intellect was clear. We could obtain no urine, and he had passed none for several hours. I remarked to the doctor that it was fever of the same type as that I had seen on the *Saleta*, and believed it to be yellow fever. I prognosticated his dissolution that night, desired Dr. Bouvier to forbid any further communication with the patient, and to exclude all but the nurse and himself. He was to use Darby's prophylactic without stint about the room. A little before 7 a. m. the next day I drove direct to the office of the board of health and issued the following order to the sanitary inspector:

OFFICE OF THE BOARD OF HEALTH,
Pensacola, Fla., August 12, 1882.

SIR: You are hereby directed to proceed at once to the house of Mrs. O'Neal and prescribe that no one enter the room in which the remains of Captain Bartoro, of the bark *Vincenzo Accame*, lie, and cause to be sprinkled on the floor and about the room Darby's prophylactic fluid. After the corpse is removed for interment the room should be fumigated with burning sulphur for several hours with all openings closed.

All the bedding, clothes, and wearing apparel of the deceased shall be steeped for ten hours in boiling water, wrung out, and dried in the sun. No one allowed to enter the room for forty-eight hours after fumigation.

R. B. S. HARGIS,
President Board of Health.

To JOSEPH COMMYNS,
Sanitary Inspector.

P. S.—It is recommended that the remains of the deceased should be interred as privately as possible.

The clothes of the nurse should be put in boiling water.

R. B. S. H.

The order was obeyed, except as to the exclusion of all friends from the funeral. I was at the office of the board of health at about 10 o'clock a. m. of the 13th, when a body of men having the appearance of sailors passed along the opposite side of the street in the direction of Mrs. O'Neal's residence. My suspicion being aroused, I asked what was the occasion of such a "turn-out," and was told they were going to attend the funeral of Captain Bartoro, of the Italian bark *Vincenzo Accame*, and the remark was made, "Let them go along; it will only create a panic to stop them." Fortunately no case could afterwards be traced directly or indirectly to Mrs. O'Neal's residence, but the focus whence the epidemic took ground ashore was visited by me on the day of that captain's death.

On the 13th of August I was called to Mrs. Rosario's house. On entering the side door, approached through a very narrow alley, I saw the corpse of a woman. Rosario exclaimed that he had sent for me three days ago, but failed to find me; had sent first for Dr. Bouvier and then for Dr. Fordham, who took charge of the case. Death had occurred during the preceding night. In the adjoining room Mrs. Rosario was in bed; she was taken sick on Friday afternoon of August 11 with a slight chill, followed by fever. She took a purgative, which acted well. I found her weak, pregnant, with some epigastric tenderness, eructation, tongue slightly coated and red at the edge, no appetite, though thirsty; could drink but little water or fluids of any kind, without feeling oppressed. The pulse was 115 per minute, temperature 99°. The face presented the same cachectic hue of the sick on the Saleta and the captain of the Vincenzo Accame, and it is almost peculiar to the Italian with the yellow fever. In health they have a rich, brunette complexion, more or less ruddy, and there is ample scope for mistake so far as the symptoms bronzing is concerned.

Mrs. Rosario had never had malarial fever, and was well in health until stricken two days previously. My attention was then called to Rosario's young daughter, about ten years of age. She had considerable fever, tongue furred, broad, and moist, and bowels confined. She had been walking about during my examination of her mother, and I sent her to bed. The dead daughter's case was reported to the board as "congestion of the brain." The course of the case I watched was not striking till the 18th, when a new feature presented itself in Mrs. Rosario's case. I found her wiping the outside of her mouth with a linen handkerchief stained with blood, and another was shown me which was considerably stained. On close examination I found that the blood came from the fauces and buccal mucous membrane. The gums were very slightly spongy, if at all, but hyperæmic. I immediately reported this case to members of the board of health as yellow fever. Dr. Leonard was sent without my knowledge, and he reports the board took no formal action, since the evidence was deemed insufficient to justify a formal announcement of the existence of suspicious cases of yellow fever. I spoke freely, but met with little encouragement. In 1873 I was most severely denounced when I published the fact that a case of yellow fever was in town. I therefore resolved to act with caution, but that nothing on my part should be neglected for the restriction of the infection to its narrowest possible limits.

It was on the 20th that, finding Mrs. Rosario convalescent, I left the room and questioned her husband as to the possible extraneous cause of these remarkably suspicious cases of yellow fever. He had not been on board the Vincenzo Accame, nor had any goods from her, nor been with the men, but he added, "My wife and daughter had clothes for the captain and crew of the vessel some two or three weeks ago, about the 1st of August; they washed them in the back yard and dried them on the fence or railing." Statements have been made to the effect that the men from the bark associated with him and occasionally visited his house.

On the 22d I was called to the residence of Mr. Francisco Moreno, on Saragossa street, to visit Miss Mary Hobson. She was suffering from fever, which on subsiding in about two days was followed by an abundant discharge of dark and highly albuminous urine. I entertained no doubt of the nature of that case.

On the 25th I was informed that Mr. Cobb was lying dead. He resided about half a block east of Rosario's residence and about a similar distance from where Miss Hobson was lying sick. I visited the place, and found the corpse dressed, with the exception of coat. Blood was upon the beard, and dark grumous fluid in the chambers. Dr. Fordham requested me to see Mrs. Cobb. She had been taken sick the day before. Did not know of her husband's death. The conclusion I arrived at and communicated to Dr. Fordham was that the disease was yellow fever. I repeated my statement to Dr. Bouvier, and that I thought seventy-two hours would settle the matter. Mrs. Cobb died on the 28th with black vomit, and the board of health then acknowledged the existence of the disease. The question then arises, what vessel infected Pensacola?

There are three against which a charge may be made: The Iris, the Saleta, and the Vincenzo Accame. After mature inquiry, notwithstanding the recurrence of yellow fever on the Iris after a first visit to Ship Island, no link can be established with the infection which reached the shore. It is possible that indirectly she may have infected some other vessel, but we have no evidence whatever to substantiate such a theory.

On the other hand, we have the most undoubted evidence of intercourse between the Saleta and Vincenzo Accame. Both vessels might have lurking infection in them or only one. Points of great nicety come in to be decided, and whilst one view favors the impression that the captain of the Vincenzo Accame might have caught the disease on the Saleta or that Mrs. Cobb may have carried the poison through Mr. Clair's store to his home from the same source, I might argue back and believe the soiled linen infected Rosario's yard and Cobb's back premises; that Miss Hobson, residing close by and daily passing Mrs. Cobb's, could easily become infected, and from there other centers sprang in the shipping and throughout the port and city of Pensacola.

The preponderating weight of evidence in favor of the Saleta being the sole source of all our trouble is that she had been to Havana and Matanzas and proved in our bay to be virulently infected. The Vincenzo Accame came from Algoa Bay, and had every opportunity of contamination by the Saleta. The all-important though inevitable fact is that the yellow-fever epidemic of 1882 came in ships into Pensacola Bay, and from them it was transmitted on shore.

THE PREVENTION OF YELLOW FEVER.

The short-comings of the past season were in part avoidable, and in part not so. It is quite improbable to hope to have that unanimity of opinion amongst members of the medical profession in a city, and amongst others whose aid might be of importance to obtain on boards, councils, and others acting as one man. We had lessened Pensacola in a sense of security, and I believe that during the preceding two or three years we owed freedom to the rigidity of our quarantine, under the local control of Dr. Leonard. Infected ships came, were cleaned, and set free, or refused pratique in certain emergencies.

Faith in quarantine had had no tendency to develop any idea of or practice in local isolation in the city, and for which we were absolutely unprepared. So far as the ships were concerned, the tendency was to prolong detention, which, of all, is probably the most serious evil of quarantine. We should base their time on the period of incubation of the disease; not on that period reported on at random, but on a demonstrated period, arrived at by selecting only cases of one exposure and subsequent attack, and of the combined exposure of several and their coincident attack. As it is well known, this will narrow the days down to less than seven; usually three, and rarely over six, shorter periods are often observed. Longer may be termed spurious, as due to indirect causes tending to less infection than supposed.

I respectfully submit that if local quarantines continue, those receiving the aid of the National Board of Health should be brought to one uniform system of, say, fifteen days' quarantine, and thus put an end to scandals and dangers which are annually recurring.

One member of a board, though he be president, is necessarily under majority rule, and when I believe the prompt discharge after a ten days' quarantine essential, others believe in safety from indefinite prolongations, it is not to be wondered at that an infected ship like the Saleta should put to sea.

There is no point in relation to quarantine so important as to give assurance to owners, captains, and crews of ships that sanitation is for the good of all, and not based on panic and prejudice. Better non-intercourse than a harassing quarantine. Better almost anything than the charge hurled at us by ship-captains that the American physicians are unscrupulous and make a fat thing out of them. Since it is my duty and pleasure to offer such considerations as in my judgment are suggested by so recent and terrible an epidemic, I do not hesitate to say that whatever truth there may be in the assertions that exorbitant sums are realized by quarantine officers in New York and elsewhere, the pittance allowed on the gulf have been totally inadequate to the service if well rendered. The public has not yet learned that disease prevention, like crime prevention, should be paid for. The last is done mainly by education; the first demands professional services, which have now to be often gratuitous, and are never reasonably remunerated. In future these things will change, but men who have to face the fury of a mob, if necessary, whilst holding responsible positions, should be suitably rewarded.

Elegant obituary notices when the doctor dies do not protect his family from want which may assail them, owing to devotion to duty. I have lived so long under the past *régime*, and am so happy in my lot amongst my clients, that those who know me will understand that I am speaking from a professional point of view for the public benefit, not with any idea of reaping further reward than my conscience this day accords me.

The lay element of the local board of health is, in my opinion, very important, and it is most fortunate when some commanding person of candor, discretion, and, above all, of administrative ability, will wield a just influence, whilst the doctors should be acting on strictly professional duties. With notable exceptions, it may be said that physicians are not good business men, and their useful brains in epidemic times should be in their special pursuits.

The Rosario case that I have just described, taken in connection with all that has been published on the dissemination of yellow fever, &c., by laundries, would indicate that quarantine should not end over the bay. The sailors' clothes have always been justly viewed as dangerous. At some convenient spot an economical laundry might be established, where everything delivered for cleaning could at once be raised to steam heat and then suitably washed and ironed. A nominal charge would encourage all to come; but, for certain months, all vessels should be *compelled* to send their washing there.

Such an arrangement could only be carried out in a limited port like Pensacola; but with the present state of the vessels entering our bay some special and unfailing provisions of protection must be devised. It is barely possible that had the soiled clothes of the crew of the Vincenzo Accame not been sent to Rosario's, yellow fever would not have gained a foothold.

The broad survey I have taken of the entire question, rather than criticising local questions of policy, has been mainly suggested by the undoubted tendency to the annual reduction of danger from epidemic invasions. The wretched vessels I have complained of are so unsuited to the Western Atlantic that ship-carpenters will alter them, and some local facility might be offered to all sailing craft that remove their fore-castle and cabin and have them on deck. Methods of ventilation and incessant purification of the bilge on ocean voyages are sure to come into practice and save much life, but in any event we are most perfectly assured that the large fast-moving traders are driving the foul remnants of a slow age from our ports. Metal is superseding wood at sea, and quick returns is the watchword now even of the lumber merchants. Twenty years will effect a revolution and each year the chances of infection will be less. With cotton and various produce reaching our bay by rail, steamers will reach us as they are doing the Mississippi wharves, and a solid town rather than a large village presents obstacles to extension of yellow fever which the sanitarian is learning how to appreciate.

We cannot altogether provide against the fallibility of human judgment, but method which has practically never been introduced in our prophylactic measures must yearly diminish the chances of injury from personal blunders that cost communities so much.

Whenever a fresh assault by the enemy occurs the conflict seems to be inevitable and the discretion of the diagnostician is either too great or too little, just as the issue may reveal. Every day's experience in fever cases indicates the wisdom of extreme caution in determining the precise nature of a case. Strong suspicion is not a demonstration, and anything short of a demonstration is justly regarded as too slender evidence on which to close the avenue of commerce. But I admit if there be any disease in which some boldness even to rashness is to be justified, it is early in its invasions to pronounce on a *first case of yellow fever*.

NEW ORLEANS, *February 28, 1883.*

APPENDIX B.

REPORTS ON MISSISSIPPI RIVER INSPECTION SERVICE.

1. REPORT ON OPERATIONS AT NEW ORLEANS, BY DR. S. M. BEMISS.
2. REPORT ON OPERATIONS AT MEMPHIS, TENN., BY DR. G. B. THORNTON.

OPERATIONS AT NEW ORLEANS.

NEW ORLEANS, LA.,
Tuesday, October 23, 1883.

Dr. J. L. CABELL,
President National Board of Health.

SIR: I have the honor to make the following report:

In conformity with instructions from the secretary of the National Board of Health, dated May 5, I inaugurated the inspection service on the 15th day of May.

I appointed as inspectors the same gentlemen who had served during the previous year with such good success and credit. Drs. F. W. Parham and P. B. McCutcheon were assigned as inspectors of river craft; Drs. L. F. Salomon and J. M. Watkins as inspectors of railroad depots and trains, and Dr. G. F. Patton as inspector at the quarantine station in the Mississippi River. These appointments were approved by the executive committee.

The Chicago, Saint Louis and New Orleans Railroad, and the Louisville and Nashville Road promptly agreed to meet the expenses of the inspection service on their respective lines of road.

Before an inspector was sent to the quarantine station in the Mississippi River, the following note was addressed to Hon. S. D. McEnery, governor of Louisiana:

NATIONAL BOARD OF HEALTH,
New Orleans, La., May 8, 1883.

SIR: I am instructed by the executive committee of the National Board of Health to inaugurate sanitary inspections similar to those which have been practiced during the last two quarantine seasons.

Unless notified by your excellency to the contrary, I will consider your permission for an inspector to reside at the Mississippi quarantine station as remaining still in force. The term of service, instructions, and duties of the inspector detailed for this purpose will be similar to those of last year. Dr. G. F. Patton will be placed in this position, as I am already informed that his selection will be agreeable to Dr. Finney.

Very respectfully, &c.,

S. M. BEMISS,
Member National Board of Health.

His Excellency S. D. McENERY,
Governor of Louisiana.

The following reply was received:

EXECUTIVE DEPARTMENT, STATE OF LOUISIANA,
Baton Rouge, May 10, 1883.

SIR: Governor McEnery has received your letter of May 8, relating to sanitary inspections, &c. He directs me to answer that the permission heretofore granted is still in force.

With great esteem, your obedient servant,

E. W. HALSEY,
Private Secretary.

Dr. S. M. BEMISS,
Member National Board of Health, New Orleans.

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The inspection service thus inaugurated appeared to be satisfactory to all who were honestly interested in its purposes.

The final reports of each of the inspectors, copies of which are in the office of the Secretary of the National Board of Health, will give in detail the character and amount of work done by each inspector.

In accordance with instructions received from yourself and the executive committee, I officially notified the inspectors that the National Board could not continue its co-operative work in aid of practical quarantine after June 30: They were consequently discharged from the service of the National Board on that day.

On the 6th of July I received the following communication from Dr. Scales:

BILOXI, Miss., July 6, 1883.

DEAR DOCTOR: I have this day, in accordance with instructions from Washington, transferred to the Marine Hospital Service, through Col. John W. Glenn and Dr. F. Finney, all the property at the Ship Island quarantine station, including the sloop, and discharged all employes. If agreeable to the Board the steamer Day-Dream could be included in the list of said property. Should this meet with your approval please notify Colonel Glenn at New Orleans. I go to Mobile to-night.

Yours, truly,

T. S. SCALES.

Dr. S. M. BEMISS,
Member National Board of Health, New Orleans, La.

I immediately addressed the following note to Colonel Glenn:

NEW ORLEANS, LA., July 7, 1883.

DEAR SIR: Inclosed is a copy of a letter just received from Dr. Scales. I have no definite instructions respecting the steamer Day-Dream, but it was regarded as part of the outfit at Ship Island, and, as I suppose, is to be included in the inventory of property belonging to Ship Island station. The steamer is now moored opposite the ice-house, a few squares above Napoleon avenue. She is in care of Larter.

I know of no charges against her except the pay and keeping of Larter since July 1, at the rate of \$35 per month.

Very respectfully,

S. M. BEMISS,
Member National Board of Health.

Col. J. W. GLENN.

The following reply was received:

OFFICE OF SUPERINTENDENT OF CONSTRUCTION,
UNITED STATES BUILDINGS,
New Orleans, July 7, 1883.

SIR: I have the honor to acknowledge the receipt of your letter of this date, inclosing copy of one from Dr. T. S. Scales. In conformity therewith I will include the Day-Dream in the property-list received from Dr. Scales, and Dr. John Godfrey, passed assistant surgeon, Marine Hospital Service, will assume charge of her.

I have the honor to remain, doctor, your most obedient servant,

JOHN W. GLENN,
Superintendent.

Dr. S. M. BEMISS,
New Orleans.

No instructions having been received in regard to any disposition of the launch in charge of Dr. Patton, I did not feel authorized to order him officially to turn it over to the Marine Hospital Service, or to any officer representing the Treasury Department. Being thus left at liberty to act for himself, he resisted the demand found in the following orders to surrender the steam-launch, which had been placed at the quarantine station to facilitate his work.

CUSTOM-HOUSE, New Orleans, July 9, 1883.

SIR: I am in receipt of a communication, dated 6th instant, from Passed Assistant Surgeon John Godfrey, of the Marine Hospital Service, in which it is stated that he understands "there is a steam-launch at the Mississippi River quarantine station lately in charge of the National Board of Health. If such is the case, I have the honor to request that you will instruct your officer at that point to take charge of

said launch in the name of the Marine Hospital Service pending instructions from the Surgeon-General." Please instruct boarding officer at quarantine station to take charge of the launch as requested, and to allow the employés to remain thereon until further orders from the proper Department of the Government.

Very respectfully,

Hon. P. B. S. PINCHBACK,
Surveyor of Customs.

THOS. C. ANDERSON,
Special Deputy Collector.

SURVEYOR'S OFFICE, July 10, 1883.

The boarding officer at the Mississippi River quarantine station will please comply with the above directions and make report of his action to this office.

Respectfully,

L. A. MARTINET,
Deputy Surveyor.

MISSISSIPPI RIVER QUARANTINE STATION,
July 12, 1883.

SIR: Inclosed please find a copy of a letter from the collector of customs, to which I would respectfully call your attention.

Very respectfully,

ALBERT BOURGES,
Inspector of Customs.

Dr. G. F. PATTON,
Inspector National Board of Health.

As soon as I was informed of this fact, I advised him to abandon charge of the launch, but could not properly reprove his conduct in endeavoring to retain charge of property placed in his custody until officially relieved by those who confided it to his care.

The expense incurred by the National Board in and around New Orleans during the months of May and June was \$1,934.81.

On the 1st day of July the Sanitary Council of the Mississippi Valley, acting in conjunction with the Auxiliary Sanitary Association of New Orleans, took charge of the inspection service in this city and vicinity. They have maintained it during the quarantine season in the same condition as it was left by the National Board, with the exception of the withdrawing of Dr. Patton immediately after the proclamation of non-intercourse was issued by the governor of Louisiana.

It is a matter of congratulation to be able to say that no case of yellow fever is known to have occurred in New Orleans during the present year. But in so far as the permanent sanitary interests of the country are concerned, we have no doubt still greater cause for congratulation in the fact that the principles and methods inaugurated by the National Board of Health in regard to practical quarantine are now being adopted throughout this section of the United States. Public sentiment now demands that infected ships be sent to properly situated and properly governed refuge stations.

Another benefit of inestimable value conferred upon the country by the National Board of Health is especially observable here in the interest so universally shown by all classes in public sanitation; also, in the greater attention paid to hygiene and cleanliness on ships, steamboats, railroads, and in hotels and places of general resort.

With this revolution in public sentiment, and with a vigorous and skillful application of the methods of notification of the presence of infectious diseases in foreign ports and the methods of enforcing quarantine recommended by the National Board, practical quarantine should soon attain to the highest state of efficiency which can be reached through human efforts.

It must, however, be admitted that those infectious poisons which produce yellow fever or cholera or small-pox are each liable to be introduced into any given port in spite of the most perfectly administered systems of quarantine. Such occurrences should be expected and met by a previously-arranged co-operative action of health authorities similar to that instituted in New Orleans in 1879. Then the State board of health, Auxiliary Sanitary Association, and National Board of Health cordially combined their efforts and resources, to accomplish the following purposes:

1st. To make the earliest practicable verification and publication of all cases of yellow fever.

2d. To secure the prompt and complete isolation of the sick.

3d. To dispose of the bodies of the dead so instantaneously after death and in such a manner that they could not become sources of infection.

4th. To cleanse, disinfect, purify, ventilate, and render as wholesome as possible all localities, premises, surroundings, and fixtures contiguous to the sick or in infected places.

5th. To disinfect persons, goods, and every material or thing liable to carry the infection to other localities or people.

When public sentiment becomes so cultivated as not alone to justify but to demand this vigilance, candor, and honest co-operation, there will be an end to extended epidemics and also to murderous outbreaks of any of the infectious diseases.

Very respectfully, &c.

S. M. BEMISS,
Member National Board of Health.

Dr. J. L. CABELL,
President National Board of Health.

OPERATIONS AT MEMPHIS, TENN.

MEMPHIS, July —, 1883.

DEAR SIR: I have the honor to submit the following report of the river inspection service above New Orleans from May 15 to June 30, inclusive, 1883.

In compliance with instructions in letter of appointment from secretary of National Board of Health of May 3, as superintendent river-inspection service I opened the inspection station on President's Island, below this city, May 15, the same having been turned over to the National Board of Health by the city authorities of Memphis to be used as an inspection station.

Dr. E. W. McMillan, of Memphis, being nominated by the Memphis board of health as inspector, was placed in charge at a salary of \$200 per month. As authorized, he had assigned to duty with him the following employes: two boatmen, one watchman, at a salary of \$50 per month each; one cook, at \$30, and one engineer for steam-launch, at \$83 per month. The station was opened by placing in commission the same hospital barge and outfit as was used last summer. This was towed from the sanitary fleet just below Memphis to the station at an expense of \$25, and some additional supplies necessary to complete outfit, amounting to \$92.66, obtained, as shown by requisition and bill for same rendered.

As instructed, I made necessary arrangements for the transmission of one steam-launch to New Orleans, to be delivered to the inspector there, which was turned over to one of the towns of the Mississippi Valley Transportation Company May 11 and delivered in New Orleans free of charge. As instructed also by secretary, May 14 I shipped by rail two barrels of sulphur from the store-boat with the fleets to Dr. T. S. Scales at Ship Island. The expense of shipment was included in the above bill of \$92.66 of J. H. Coffin & Co., rendered for the month of May.

The inspections at the station from May 15 to June 30 were as follows: steamboats, 30; tow-boats, 16, with tows of 156 barges; total number of crews and passengers of these, 3,999.

The weekly reports made the secretary give in detail the tonnage of these boats, the number of crew and passengers of each, the character of freight, the date of departure from port, destination, sanitary condition, &c. No sickness of a serious character was found on any during the period the service was in operation.

Respectfully,

G. B. THORNTON, M. D.

Dr. J. L. CABELL,
President National Board of Health.

APPENDIX C.

IMMIGRANT INSPECTION SERVICE.

1. RESULTS OF THE IMMIGRANT INSPECTION SERVICE, WESTERN DISTRICT, BY JOHN H. RAUCH, M. D., SUPERVISING INSPECTOR.
2. RESULTS OF THE IMMIGRANT INSPECTION SERVICE IN MICHIGAN, BY H. R. MILLS, M. D., SUPERVISING INSPECTOR.
3. REPORT ON IMMIGRANT INSPECTIONS AT BALTIMORE, BY JAMES A. STEWART, M. D., INSPECTOR.
4. REPORT ON INSPECTION SERVICE AT PHILADELPHIA, BY ROBERT KILDUFFE, M. D., INSPECTOR.
5. REPORT ON INSPECTION SERVICE AT PITTSBURGH, BY W. SNIVELY, M. D., INSPECTOR.
6. REPORT ON IMMIGRANT INSPECTIONS IN NEW YORK STATE, BY ELISHA HARRIS, M. D., SECRETARY NEW YORK STATE BOARD OF HEALTH.

CONSOLIDATED REPORT OF THE RESULTS OF THE IMMIGRANT INSPECTION SERVICE, NATIONAL BOARD OF HEALTH, WESTERN DISTRICT.

By JOHN H. RAUCH, M. D., *Supervising Inspector.*

Total number of immigrants inspected June 1 to December 31, 1882.....		115, 057
Found to have been satisfactorily vaccinated before sailing or during the voyage	57, 302	
Found to have had small-pox.....	3, 127	
Vaccinated at seaboard quarantines or by intermediate inspectors.....	28, 408	
Vaccinated in the western district.....	21, 618	
Not accounted for, including those deemed inadvisable to vaccinate.....	4, 602	115, 057
Total number found to have been vaccinated or revaccinated on shipboard		38, 414
Results:		
Typical	7, 963	
Modified.....	1, 320	
Failure	24, 131	38, 414
Total number of vaccinations performed in the western district.....		21, 618
Primary		3, 242
Secondary	18, 376	21, 618

From the foregoing figures it will be seen that only a little over one-half (52.5 per cent.) of the immigrants who arrived in this country during the inspection season, June 1 to December 31, were satisfactorily protected against small-pox; that during this period the West and Northwest received, via Indianapolis, Saint Louis, and Chicago, 54,628 immigrants direct from small-pox infected centers, and liable to the disease when they landed in this country; that of this number 28,408 were vaccinated at seaboard quarantines or by inspectors in the eastern district, and 21,618 by inspectors in the western district.

The following passages from the monthly reports of the supervising inspector convey all other needed information:

From report for August, 1882.—In Chicago there have been only 24 cases and 5 deaths during the month, and at the close of the month there were only 3 cases under treatment in hospital, and 2 in the city.

To the table presented last month are now added the figures for August, showing the continued decline in that city since beginning inspection.

Month.	Cases reported.	Deaths.	Remarks.
April.....	321	95	Inspection began June 1. Average decline before inspection, 12 per cent. Average decline since inspection, 78 per cent.
May.....	281	65	
June.....	154	29	
July.....	44	11	
August.....	24	5	

This result plainly demonstrates that no matter how efficient a health department may be within its own limits, nor how general and thorough vaccination may be made in a given community, large cities like Chicago must be protected from without against *laches* and defects in the administration of seaboard quarantines in order to escape the effects of continuous importations of foreign contagion.

From report for September, 1882.—Evidence of the growing interest in this protective measure is found in the increasing numbers of immigrants vaccinated, or revaccinated just before sailing. This is especially true of the English, and Scotch, and in a great measure offsets the occasional opposition to the inspection met with from individuals of the same nationalities, and which seems to be due to the anti-vaccinationists of Great Britain.

Vaccination performed at this time, *i. e.*, prior to sailing, has the advantage of enabling the steamship surgeon to judge of its effectiveness during the voyage; and it would be a decided improvement on the present general plan of waiting until the last days of the voyage, if the surgeon would perform the operation as soon after leaving port as practicable. This would give him an opportunity of noting the value of the virus and result of his work, besides facilitating the labor of inspection upon and after arrival. I think that a circular letter from the Board making this request of the managers of the various steamship lines would meet with a favorable reception.

The disparity in the results of vaccination performed on shipboard is due possibly as much to the method of performing the operation as to the character of the virus employed, though there is doubtless much of this used which has become inert, either from being kept too long or from exposure to the salt moist atmosphere. Both of these evils would be more likely to be remedied if the surgeon was able to follow up the results of his work.

As all doubtful cases in this district—that is those in which the evidence of proper vaccinal protection is not clear and unmistakable—are carefully vaccinated with virus seldom more than seventy-two hours from the heifer, it is probable that those passing through our hands are more thoroughly protected than many of our own citizens.

Recent action in England, detailed in the following, will tend to still further lighten the responsibility of this service:

Dr. Bloxall, R. N., one of the medical inspectors of the local Government board, accompanied by Captain Wilson, representing the Board of Trade, has opened at Liverpool an inquiry with regard to certain sanitary questions connected with emigration, and as to the circumstances in which emigrants passing through the port of Liverpool are placed before sailing. He is likewise instructed to inquire as to the provision made for the isolation and treatment of sick persons arriving from infected places on the Continent or in the United Kingdoms; and, further, as to the sanitary arrangements and supervision of the lodging houses into which emigrants are received, and the means taken with respect to infectious diseases occurring therein. [It should be observed that this action was a direct result of the influence brought to bear upon the treatment and condition of immigrants by this inspection service.]

From report for December, 1882.—The same gratifying exemption from imported small-pox, as noted in my last report, continues to obtain in the district embraced by the service, and in the region westward covered by this district.

Even in Chicago, with its cosmopolitan population, and upward of a hundred thousand immigrants either permanently or temporarily sojourning within its limits during the inspection season, the health commissioner, Dr. De Wolf, informs me that there has not been a single case, among the few that have continued to appear in the city, which could be attributed to newly-arrived immigrants. In other words, all of the recent cases have been either among unprotected residents, or among foreigners who arrived prior to the beginning of the inspection service.

With the exception of one immigrant during the month of June in Illinois, and one immigrant family during the month of August in Minnesota, it is not known that a single case of the disease has appeared among this class during the past six months in the entire Northwest. This is the more remarkable when it is considered that the service has been largely experimental in an entirely new field of sanitary effort, and, like all experiments, must have been more or less imperfect. It is not to be presumed, for example, that all the immigrants entering or passing through the district have

* The absence of any serious complications or results attending the vaccination of these thousands of people in transit is well worthy of note. Among those coming under observation in this district—aggregating nearly 40,000 vaccinations performed immediately prior to or during the journey—less than a dozen cases of mild erysipelas were reported, there was a remarkable freedom from the "raspberry tumors," or keloid growths, so frequently met with among domestic vaccinations during the previous winter, and the occasional instance of undue inflammation was always clearly attributable to want of cleanliness, or to mechanical irritation caused by neglect of proper protection for the sore. Such a result was hardly anticipated, as both the personnel and habits of immigrants and their surroundings during travel are well calculated to develop those septic conditions which would interfere with the normal and uncomplicated progress of vaccina. These results, in an experience of such proportions, should suffice to overcome any opposition to immigrant vaccination on this ground.

been encountered by the inspectors, or that their vaccinations have in every case resulted in perfect protection. But whatever the deficiencies, enough has been done to demonstrate that by the aid of such a service, perfected, as it would be, by being continuously maintained through the immigration season, and coupled with the general and systematic vaccination and revaccination of our native and naturalized populations, this loathsome disease may soon be put in the way of ultimate extinction in the United States.

IMMIGRANT INTRODUCTION OF SMALL-POX INTO THE UNITED STATES.

In reviewing the experience of the past six months' operations of the immigrant inspection service, in connection with the history of small-pox in Chicago for thirty-two years, and the testimony of leading health officials concerning the origin and spread of the epidemic of 1880-'82 in the United States, the truth of the following propositions seems to me to be demonstrated :

I.—The immigrant is a prime factor in the origin and continuance of small-pox in the United States—on the one hand, even if protected himself, often being the bearer of the contagion in clothing and other effects; and, on the other, if unprotected, frequently becoming a victim to the disease and propagating it to others.

II.—Local effort and expenditure, either by States or municipalities, are inadequate to the control of small-pox in any given community or commonwealth, so long as the contagion and the material for the propagation of the contagion continue to be replenished by the repeated accessions of unprotected or imperfectly protected immigrants.

III.—A continuous sanitary surveillance of immigrant travel, from the port of arrival to the point of ultimate destination—such surveillance to consist of repeated inspections, vaccination of all unprotected, systematic observation of suspicious sickness, prompt removal and isolation of discovered small-pox or other contagious cases, disinfection of baggage, clothing, cars, &c.—is essential to supplement whatever preventive measures can be secured before embarkation, during the voyage, or at the port of arrival.

(1) The proposition that "the immigrant is a prime factor in the origin and continuance of small-pox in the interior," is based upon the following facts:

1. That the greater or lesser prevalence of small-pox in this country corresponds closely with the greater or lesser number of immigrants received, and with the existence of small-pox in the countries from which such immigrants come.

2. That small-pox has reappeared in the city of Chicago at nineteen different times, after periods of entire freedom from the disease; and in fourteen of these reappearances it is positively known to have been introduced by immigrants, and to have spread directly among and from them.

3. That the first cases of the recent epidemic (1880-'82) were either among immigrants or were contracted in localities already infected by immigrants in upwards of 75 places in the State of New York; in Pittsburgh, Pa., in Cleveland, Ohio; in Detroit, Port Huron, East Saginaw, Reed City, and many other places in Michigan; in Indianapolis, Michigan City, and other places in Indiana; in Chicago and 28 counties (62 times) in Illinois; in Milwaukee and elsewhere in Wisconsin; in Saint Paul, (Minneapolis, Stearns, Morrison, and Wilkins Counties, Minnesota; in Davenport and elsewhere in Iowa; in Omaha, Nebr.; and in Saint Louis, Kansas City, and other points in Missouri. (See appended digest of replies received.)

(1.) The coincidence between the greater or lesser prevalence of small-pox, and the greater or lesser immigration, is shown in the appended table of small-pox mortality in Chicago, covering nearly a third of a century, and which I have compiled from various sources, embracing my own unpublished memoranda, made while sanitary superintendent of that city.

From this table it will be seen that between 1851 and 1858 there were deaths from small-pox each year, the maximum being reached in 1855. Records show that immigration into Chicago, both for permanent residence and for distribution, first attained important proportions in 1853, and continued until 1858, when it was checked by the results of the panic of 1857.

From June, 1858, until the close of 1862, there were only 11 deaths from small-pox in Chicago. But in 1863 there were 115 deaths, and up to the end of June, 1865, there had been 453 deaths. During this period, that is, from the beginning of 1863, immigration again revived, and although some share of the small-pox cases was contributed from the large number of soldiers and prisoners of war at Camp Douglas, the great majority were among newly-arrived immigrants and their friends.

This revival continued with little change until the spring of 1872, although it was temporarily interfered with by the prevalence of cholera in 1866. In 1872 there was a marked increase of both foreign and domestic immigration into Chicago, attracted by the rebuilding of the city after the great fire. The deaths from small-pox during this year were 655, and up to the close of the epidemic, then begun, were 1,321.

Immigration gradually declined from this point until it reached its minimum in 1879, as a result of the prolonged hard times. For the 16 months ended November, 1879, there had been no death from small-pox; but in March, 1880, simultaneously with an unusual increase in immigration, began the first cases of the epidemic of 1880-'82.

What is true of Chicago in respect of coincidence between immigration movement and small-pox is substantially true of the Northern States generally, through which, or into which, immigration flows. But in the case of Chicago, at least, the connection does not rest upon coincidence alone. In the fourteen reappearances of small-pox in Chicago during the 32 years beginning in 1851, and already mentioned, the first cases were introduced directly by immigrants as follows:

In April, 1851; July, 1852; April, 1857; April, 1858; June, 1860, after a cessation of twenty-three months; in September, 1861; May and July, 1866; April, 1870; October, 1871; March, 1876; March, 1877; July, 1878; November, 1879, after a cessation of sixteen months, excluding one immigrant case in May, and from which no other known case resulted.

All these months, it will be seen, are included in the immigration season and the majority of them in that portion of the season when the number of immigrants arriving is greatest, viz, March, April, May, and June.

My attention was forcibly attracted to this relation of the immigrant to small-pox reappearance, as cause and effect, by an official experience in Chicago, during the epidemic of 1871-'75. For nearly three months, in 1871, there had not been a single case of the disease in the city, when, on the 16th of October, seven days after the great fire, a party of immigrants arrived from New York, just landed from a Hamburg steamer, and took up their abode in the already overcrowded houses of friends in the seventh and eighth wards. As it subsequently transpired, three of the party were suffering from small-pox on their arrival; but, in the confusion which followed the destruction of the city, nothing was known of this fact until the death of one of their number was reported, October 29. This led to an investigation which disclosed the two surviving cases, and three new cases among their friends in the seventh and two in the eighth wards. From these, despite such efforts as could be made under the circumstances, the disease rapidly spread, so that in November there were 44 cases in the immediate neighborhood of the original group, and 24 others scattered throughout the city, nearly all among foreigners. In November, another immigrant arrived with the disease, and in December two more. By this time the contagion had spread to nearly every part of the city, 223 cases and 47 deaths occurring in December.

Every effort was made to subdue this additional calamity, among other measures rigorously enforced being the vaccination of the large numbers who obtained supplies from the Relief and Aid Society, and, notwithstanding the cold weather, which is an important factor in the propagation and spread of small-pox, the disease was substantially held in check until the month of March, when large numbers of immigrants began to arrive, attracted by the demand for labor in rebuilding the city, and the high rate of wages then paid. Among these arrivals there was the usual proportion of infected, eighty cases, in all, being removed from railway trains at the various depots during the season.

The remainder of the history to the close of the epidemic may be briefly summed up: Checked by warmer weather, its epidemic proportions were still maintained by immigrants arriving during May, June, July, August, and September; directly increased with the increase of immigration in October, which increase was thenceforth maintained by the cold weather through the winter of 1872-'73; declined with rise of temperature in March, but again increased with the arrivals of immigrants in April, and continuing without marked change until the October immigration and the falling temperature caused a still further increase during the fall and winter. In January, 1874, however, the diminished susceptibility of the population, and the amount of vaccinal protection which had been secured resulted in a marked decrease, which was maintained until the following April, when the usual influx of immigration was followed by the usual increase in the number of cases; this increase continuing until the end of July, then declining until October, when there was an increase (immigrant), which was lost in November and December; increased in January, 1875; declined in February and March; increased in April (immigrant), and finally disappeared in July, after a continuance of forty-seven months.

(3) From the present health commissioner of Chicago, Dr. Oscar C. De Wolf, to whom I am indebted for other data connected with this subject, I have obtained the recital of a similar experience, confirming my own observations of the recent epidemic.

Chicago had been entirely free from small-pox from July, 1878, up to nearly the close of November, 1879, with the exception of one immigrant case in May, of the latter year, but from which no other case resulted. In the latter part of November, 1879, an immigrant, suffering from small-pox, arrived at the Hotel Denmark, an immi-

grant boarding-house, and from him an employé of the hotel contracted the disease. This man died in December, and from him resulted one more case in December, eight in January, four in February, and three in March—none fatal. The disease was apparently under control and in process of extinction; but in April began the usual arrival of immigrants, with a number of infected ones, and there were 30 cases, 9 deaths, in that month; 22 cases, 4 deaths, in May; 39 cases, 10 deaths, in June. The energetic efforts of the health commissioner, his inspectors, Drs. Garrott, Hall, and Sawyer, and Health Officer Merki, supplemented by the warm weather, caused a decrease in the disease, which, however, was not entirely suppressed when the October immigration movement set in, with an even more than usual increase in the number of cases. During the winter months there was the ordinary maintenance, but in April the number rose from 99 cases and 31 deaths (March) to 133 cases and 39 deaths; in May, to 163 cases and 68 deaths. In June there were 151 cases, 61 deaths; in July 165 cases, 83 deaths, followed by a slight decrease in August, which was succeeded by 252 cases and 116 deaths in September; 414 cases, 188 deaths, in October—the heaviest autumn immigration month; 512 cases, 206 deaths, in November, and 801 cases, 274 deaths, in December, making a total for the year of 2,992 cases and 1,180 deaths. The epidemic culminated in January, 1882, when there were 852 cases and 271 deaths, and thenceforward declined until it was pronounced substantially at an end in September last, although it is noteworthy that the decline was checked, though the numbers were not increased as usual by the spring immigration. The immigration of 1881 was the largest ever received in this country up to that time.

Dr. De Wolf thinks that there were almost daily arrivals of infected immigrants during all this period until the inauguration of the Inspection Service, since which time, among the cases which have occurred, not one has been traced to an immigrant, either directly or indirectly. Drs. Garrott and Hall both agree that fully four-fifths of all the cases were among foreigners; that it was “unusual to meet with a small-pox patient who could speak good English.”

Still further and equally striking proof of the exotic origin of our small-pox epidemics is to be found in the history of the past three years for the country at large. The November 8, 1879, National Board of Health Bulletin contained the following:

“The mortality tables of the Bulletin have for many weeks presented the interesting fact that in more than one hundred of the largest cities of the United States, containing an aggregate population of over eight millions, not a death of a citizen from small-pox has been reported. This is one of the diseases that cannot escape detection and correct diagnosis when it proves fatal. The returns may, therefore, be regarded as entirely reliable in regard to this disease in all cities requiring burial permits. A reference to the tables of mortality in foreign cities, compiled from the weekly consular reports, which are now made with great care and accuracy, show that small-pox is prevailing in various parts of the world, and in certain places with great severity. This is especially the case in some Canadian towns, in dangerous proximity to, and in immediate communication with, the United States. Considering the certainty with which this most loathsome of all contagious diseases may be prevented, the present exemption of the United States from its presence, its ravages in Montreal, and the unrestricted intercourse between that city and the towns along our borders, emphasize the arguments heretofore advanced in favor of international co-operation in an effort to exterminate contagious and infectious diseases.”

There had, indeed, already been an importation of the disease in October from Montreal into Vermont, but during the months of November and December, 1879, there were only twelve deaths reported from small-pox in all the Northern States and among a population of over 34,000,000; while it continued to increase in Europe in countries having direct and frequent communication with us. Early in the spring of 1880 infected vessels began to arrive at New York—in April the *San Stefano* and the *Zeeland*, both from Antwerp. The first death in New York from March 6 to May 15 was that of an immigrant who arrived May 6, by steamer *Hapsburg*, from Bremen. Following this were arrivals by the General Herder, from Hamburg; Arizona, from Liverpool; Main, from Bremen; Allemania, from Hamburg; Kings County, from Antwerp; and Castalia and Italia, from Naples. In June, five Bohemian immigrants, who arrived June 6 at New York, and were passed through quarantine, developed the disease in Cleveland, Ohio. But prior to this the disease was introduced into Chicago after a total exemption of nearly two years, there having been only three deaths in July, 1878 (immigrants), and one in December, 1879, from April, 1878, to April, 1880.

(II) The proposition that State or municipal effort and expenditure are inadequate to the control of small-pox during seasons of great immigration movement, also receives signal support from the history of the recent epidemic. Until the inauguration of the Immigrant Inspection Service of the National Board of Health, June 1, 1882, soon after the arrivals of immigrants had reached their maximum, the average number of fresh importations of the disease, by immigrants, into Illinois had been eight per

month—there being nine in the month of May—exclusive of its almost daily introduction into Chicago, from which center the infection was carried into over two hundred points throughout the Northwest.

Notwithstanding the efforts of State and local boards of health, these had resulted in numerous outbreaks of the pestilence, which spread panic and alarm among the people, interrupted business, closed schools and churches, gave rise to quarantines, and involved a large expenditure of money in vaccinating, in caring for the sick, in the isolation and disinfection of premises, the destruction of infected clothing and other property, &c.

Since the inauguration of the service, in June last, there has not been a single outbreak in Illinois due to immigrants, and only one case developed among the immigrants themselves, after coming within the purview of the service.

As in Illinois and Chicago, so also in all the other States and places under observation. With the single exception of the outbreak in Minnesota, during the month of August (referred to in the digest below), it is not known that the disease has been introduced into any portion of the vast territory covered by this service, although small-pox cases, in every stage of the malady, have been repeatedly arrested by the inspectors, *en route* through New York, Ohio, Indiana, Michigan, Missouri, and Illinois.

(III) Concerning the third and last proposition, to wit, that a continuous sanitary surveillance of immigrant travel is necessary to supplement whatever other preventive measures can be secured before embarkation or during the voyage—I am compelled to admit that my opinions of a year ago have undergone a material modification.

I then held that, if immigrant passengers could be inspected and vaccinated on embarkation or during the early part of the voyage, there would be little or no necessity for inspection after landing. There is no existing authority, of course, to compel such preinspection and vaccination. But if the most perfect international quarantine legislation could be secured to this end, my recent experience, which I have reason to believe accords with that of others under similar circumstances, conclusively proves that even its *bona fide* enforcement would not protect the interior from imported contagion.

For example: Given the existence of small-pox at the port of embarkation, the exposure of a greater or lesser number of unprotected immigrants during the period of rendezvous is certain. The inspection of such individuals at the time of embarkation would reveal nothing beyond the fact that they required to be vaccinated. But, if the exposure ante-dated the vaccination three or four days, they might arrive at New York quarantine with vaccinia visibly progressing, but no evidence of small-pox; and thus be passed on, to arrive at Chicago in the eruptive stage of varioloid. If the vaccination should be deferred until during the voyage, the risk of such results would be proportionately increased. For this dilemma, which grows out of the character of the disease itself, there would be no remedy short of the detention and observation of all unprotected persons for the full period of incubation, say two weeks before embarkation. Such a course is obviously impracticable, and it is idle to expect any legislation which would be so radical in its character and so onerous, vexatious, and expensive in its enforcement.

In the foregoing illustration of the difficulties in the way of European inspection, a theoretical perfection of service is assumed which it would be folly to depend upon in practice. I am forced to the conclusion, by repeated instances which have come under my own personal observation, that the sense of responsibility, and consequent thoroughness of work, bear a direct relation to the distance between the inspector or vaccinator and the point of ultimate destination of the immigrant. Inspectors on duty at Liverpool, or Havre, or Bremen, or Hamburg, and surgeons on steamers from those ports, lack the stimulus that an inspector in Chicago feels from the knowledge that, if small-pox should break out among the immigrants passing through his hands, it could be readily traced home to him; not alone from the towns and prairies of his own State, but from the lumber camps and villages of Wisconsin, the wheat-fields of Iowa and Minnesota, or even remoter regions beyond the Mississippi. Such a stimulus is necessary in order to secure vigilance in inspection, thoroughness in vaccinating, and due care in the proper selection of virus—matters which were very generally ignored by the steamship surgeon prior to the establishment of the Inspection Service of the National Board of Health.

A writer in a recent issue of a medical journal, speaking of this Immigrant Inspection Service, says: "Under the present system, it is quite plain that very few unprotected immigrants escape vaccination by the time they reach the West. It is equally clear, however, and we wish to reiterate the fact, that this system is cumbersome, expensive, and unnecessary."

What he reiterates is an assertion, not a "fact"; and he cites no facts to support his assertion. His substitute for this "cumbersome, expensive, and unnecessary" system is implied in the following passage: "It is but fair that these [steamship]

companies should be compelled to land none but protected immigrants at our ports. [How they shall be "compelled" is a trifling consideration, which he evidently deems it unnecessary to discuss.] The vaccinations can readily be done on shipboard during the voyage, thus avoiding all the delay and expense now incurred."

This latter statement can only be excused on the ground of familiarity with the subject, either from a theoretical or a practical standpoint.

Vaccination performed "onshipboard" has been demonstrated to be practically unreliable in the gross, as shown in my entire series of reports on this service, which are records of fact—not generalizations, nor speculations.

There has been no "delay" occasioned by the service; on the contrary, the inspections have been faithfully performed, without interfering in the slightest degree with the movements of the immigrants. There have, however, been several occasions during the past six months, when, in the absence of such a service, the business of the railroads would have been seriously interfered with.

As to the question of "expense": The direct money cost of the importations by the steamer *Cimbria* alone into Michigan and Iowa in April last, or by the *Hermann* into Illinois during the spring, amounts to more than would suffice to maintain the service for an entire season.

The service has been demonstrated to be in the interest of our own people—who are secured by it from imported contagion; of the immigrant—who is protected through it from the effects of his own neglect,* and to whom it has brought better care and increased comfort in transit across the country; and to the common carriers of these immigrants—who are relieved by it from the menace of local and State quarantines of exclusion which would inevitably have been resorted to in the interior, had it not been for the inauguration and maintenance of the Immigrant Inspection Service.

In the absence of international quarantine regulations and of uniformity in the administration of our maritime and boundary quarantines, the substitution of a simpler, less expensive, and more useful system may be possible, but is not probable. Certainly nothing had heretofore been done in this direction which secured the same amount of benefit at the same cost. And this cost, it should be borne in mind, is equitably defrayed from the general Treasury, instead of being saddled upon States and communities which, prior to the inception of this service, were compelled to protect themselves against evils for which they were not responsible, and whose attendant benefits they shared with others or had no participation in whatever.

In my opinion, Congress can make few wiser or more useful appropriations, and none which would command a more general and emphatic approval, from the Northwest at least, than one for the continuance of this service.

DIGEST OF REPLIES CONCERNING THE ORIGIN OF THE SMALL-POX EPIDEMIC, 1880-'82.

Minnesota.—C. N. Hewitt, M. D., secretary of the State board of health, writes, October 18, 1882: "July 20, 1881, the first case of small-pox occurred (from exposure to clothing of an immigrant) in an infant. The immigrant, a woman, claimed to have been exposed on the steamer; to have been quarantined at the seaboard; vaccinated and clothing disinfected. She had not been sick, nor was she afterwards. From this exposure to infected clothing a large number of deaths resulted."

Dr. D. W. Hand, president of the State board of health, writes, November 6, 1882: "We had been almost entirely free from the disease in Minnesota for a long time prior to July, 1881.

"From that case in July, from immigrant clothing (cited by Hewitt above) we can trace nearly all the outbreaks we had in Stearns, Morrison, and Wilkins Counties, and in Minneapolis and Saint Paul."

There were, subsequently, other importations of the infection reported by Dr. Hewitt, as follows:

"March 7, 1882. Immigrant, male, from Canada, came down a few days after arrival.

"April 4, 1882. German immigrant, taken sick four days after reaching Minnesota.

"April 25, 1882. Scandinavians, broke out some days after arrival; found in a deserted house.

"May 29, 1882. Norwegian immigrant, several days after arrival.

"August 5, 1882. An outbreak from an immigrant family; history not known."

* During the six months of the inspection season ended November 30, an aggregate of over 130,000 immigrants has been permanently added to the population of the northwest, of which number 107,431 passed through the hands of inspectors in the western district. It is probable that no equal number of people in the same region are so well protected against the risk of contracting or propagating small-pox as these. The repeated inspections and vaccinations have resulted in a vacuinal security which will continue during life, in a large majority of them. The work of the service is thus seen to be permanent in its character.

Wisconsin.—Dr. J. T. Reeve, secretary of the State board of health, writes, November 15, 1882: "We have the record of a number of cases of the disease brought by immigrants, but more, I think, of cases traceable to other States, particularly to Chicago."

R. Martin, M. D., health commissioner of Milwaukee, writes: "Since July 6, 1881, up to May 27, 1882 (date of last importation), we have had four outbreaks of small-pox by immigrants, as follows:

"July 6, 1881. An immigrant family arrived and put up with friends. Three children of the latter family were taken sick with small-pox, and one died. Infection attributed to clothing of immigrants.

"April 14, 1882. A woman, sick on arrival, died eight days after, and two of her children soon took the disease, and one died.

"May 1, 1882. Six Polish immigrants were taken down a few days after arrival, and a fortnight later 2 more cases in same house.

"May 27, 1882. Three Germans taken sick immediately on arrival."

Indiana.—Thad. M. Stevens, M. D., secretary of the State board of health, writes, October 12, 1882: "Small-pox has appeared in ten or twelve different localities, and in a majority of cases was introduced by immigrants."

Dr. E. S. Elder, health officer of Indianapolis, says: "Small-pox was introduced into this city three different times by immigrants, and upon four other occasions by travelers exposed in some unknown manner. At Michigan City I understand it was also introduced by immigrants."

Michigan.—From advance sheets of the report of the State board of health, kindly furnished by the secretary, Henry B. Baker, M. D., the following abstract is made:

"During the year ended September 30, 1882, there were over 100 outbreaks of small-pox in sixty-one localities, with 539 cases and 159 deaths. Including one outbreak not accurately reported, there were probably over 600 cases and 175 deaths.

"The source of the contagion, in all the first cases where the source was ascertained, was from outside the State. In twenty-one instances it came direct from Chicago. It was introduced by immigrants direct into Port Huron and Detroit twice each, and once each into two other points, from which it was carried into seven other localities, causing 56 cases and 7 deaths. [These latter introductions were by immigrants from the same steamer which was the origin of the epidemic in Davenport, Iowa, concerning which vessel Dr. Baker reports:]

"The steamship *Cimbria* sailed from Hamburg March 29, 1882, arriving in New York on April 12, with a case of small-pox on board. Passengers on the *Cimbria* came to Michigan. One, Bettit, went to East Saginaw, where he had varioloid, and communicated the disease to others. In that outbreak there were 6 cases and 1 death. A friend from Saginaw City, who watched with the sick in East Saginaw, had small-pox. Another passenger, Gesa, went to Reed City, where he had varioloid, and gave it to four others, one of whom died. Among those who contracted it was a carpenter who went to Westwood, Kalkaska County, where he was taken sick. From him there were 11 cases in Mancelona, Antrim County; 3 cases in Custer, Antrim County; 29 cases and 5 deaths in Rapid River Township and Westwood Village, Kalkaska County."

Iowa.—A. W. Cantwell, M. D., health officer, Davenport, writes, November 10, 1882: "The first case was reported April 19, 1882—Mr. Petersen, confluent small-pox—passenger by steamer *Cimbria*, from Hamburg, March 29, arriving in Iowa April 15. From this group of immigrants, consisting of Petersen, wife and child, Mrs. Petersen's brother and his wife, it was learned that one person died of small-pox at sea, and two others, supposed to have the disease, were taken from the vessel at quarantine, New York, where they were detained one day.

"These people had all been vaccinated on shipboard without effect, and were re-vaccinated on arrival in Iowa, but too late to protect Petersen and child, the former of whom (April 25) had varioloid, and the latter small-pox. The brother and wife nursed the Petersens and escaped, their Iowa vaccinations taking nicely.

"Two children in adjoining house on the west, and a lady in house adjoining east, contracted the disease from the Petersens. The parents of the children had been opposed to vaccination, and both families, denying that the Petersens had the small-pox, visited the premises and talked with the nurses in the back yard of the infected house.

"From these cases it spread westerly—18 cases in the west half of the block where the Petersens lived, 11 cases in the next block west—until there were in all a total of 59 cases in the eleven blocks which comprised what came to be known as the 'infected district,' and 22 cases, almost exclusively among the Germans, in the rest of the city.

"The total number of cases from this importation by the *Cimbria* was 71, with 11 deaths, and the city was not finally freed from the infection until September 4, having lasted nearly five months, to the great detriment of business and direct cost to the municipality and individuals."

Saint Louis, Mo.—W. B. Conery, M. D., health department, writes, September 16, 1882, that from April 1, 1881, up to date, there had been 356 small-pox patients sent to hospital at quarantine from the city.

The first case, May 7, 1881, a German immigrant; in the city only a few days.

No other cases until September 3, 1881; two German families; disease contracted on shipboard and thoroughly developed before arrival in Saint Louis; 7 cases and 2 deaths.

October 19, 1881, case taken from an immigrant boarding-house; subsequently 11 more cases from the same house.

"This is the history of the beginning of this loathsome disease during the past year in Saint Louis."

Pittsburgh, Pa.—Dr. W. Snively, health officer, writes, October 11, 1882: "Small-pox was introduced into this city by immigrants and tramps from the East, via Pennsylvania Railroad, on January 16, 1881.

"As the disease prevailed extensively and uninterruptedly in this and the neighboring city of Allegheny, from that date until July 1, 1882, and as no attention was paid during that time to the arrival and passing through this city of immigrants, I am unable to give you further information.

"During the months of July, August, and September, 1882, this city was entirely free from small-pox."

Cleveland, Ohio.—G. W. Ashmun, M. D., health officer, writes, October 14, 1882: "Small-pox was introduced into this city by immigrants, during the eighteen months preceding July, 1882, in six separate instances, beyond all question, and in three other instances there was scarcely a doubt that such was the source of contagion."

New York.—Elisha Harris, M. D., secretary of the State board of health, writes, November 8, 1882: "I feel warranted in stating that about 30 per centum of all new outbreaks I have known in New York the past twenty years were directly traceable to immigrants. But that in the eighteen months prior to July 1, 1882, the number of such outbreaks traced to immigrants was less than ten in a total of fifty new outbreaks and in nearly one hundred places. The greater number of the fifty and the one hundred places derived their contagion from the cities of New York, Brooklyn, Troy, Buffalo, Jersey City, and Philadelphia. Yet, in each one of these six cities, I know that the contagion was constantly replenished from Europe or Canada, and thus these foci of infection to the State of New York at large simply distributed to our towns, villages, and interior cities. Far more than half of the 150 notifications sent to me from the interior local boards of health in eighteen months ending in July last were thus indirectly traceable to exotic contagion."

At the conference on small-pox held in Chicago June 29-30, 1881, the following statements were made:

"All the cases of small-pox in Buffalo this year had either been brought in by immigrants, mostly Polish, or had been contracted from them."—A. H. Briggs, M. D., health officer, Buffalo, N. Y.

"Of 62 cases now in the small-pox hospital, 50 of the sufferers cannot speak English. Patients arrive in Chicago from New York and Baltimore who have reached the eighth, ninth, and tenth day of eruption. In one case a woman, who came by the way of Baltimore, died in four hours after reaching the city. The trouble is that the disease is not always sufficiently developed at the port of entry to enable the inspector there always to detect it."—O. C. De Wolf, M. D., health commissioner, Chicago.

"Small-pox was introduced into Iowa in twenty or thirty instances during the spring of 1881. In many of these cases, particularly in the northeastern part of the State, the disease was traced to recently arrived immigrants."—R. J. Farquaharson, M. D., secretary Iowa State board of health.

"There have been 4 or 5 cases of small-pox introduced into Wisconsin this spring by immigrants."—J. T. Reeve, M. D., secretary Wisconsin State board of health.

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Table of mortality from small-pox in the city of Chicago from 1851 to 1892, inclusive.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Totals.
1851				1	2			1			1		5
1852	2						2	4		1			9
1853	2	2	1	2	2	4		1		1		3	19
1854	1	1	1	1	2		2				1	2	12
1855	5	3	2	5	1	1	2	1			1	3	30
1856	5	3	2	4	2	1							16
1857	1			1	1	2		2			1		10
1858	1			3	1								5
1859													
1860						1	1			1			3
Total	20	11	6	18	11	11	7	9		3	5	8	109
1861									1		2		3
1862	1	1										3	5
1863	4	9	8	9	7	11	4	4	7	10	16	26	115
1864	55	40	37	85	32	19	25	8	6	8	11	12	283
1865	8	18	17	4	5	3		1	1				57
1866	2				1		2	1	1			2	9
1867	1	5	3	8	3	4	8	11	13	20	19	28	123
1868	89	33	35	13	15	11	2					2	150
1869	1	1	2	2	3	3	2	1	8				18
1870	1	1		3	2	5	2	1					15
Total	112	108	102	73	66	54	45	27	32	33	48	73	778
1871	2	2		1	1	3	3			1	13	47	73
1872	65	54	97	80	68	60	26	29	20	27	63	66	655
1873	62	53	85	44	56	45	52	31	33	32	36	36	515
1874	24	11	8	17	14	7	7	1	1				90
1875		2	3	3	1	1							10
1876			3	5	6	4	3	1	1	3	2		28
1877			1	3	2	2	4	7	7	4	5	8	43
1878	7	5	2				3						21
1879												1	1
1880				9	4	10	3	1	2	3	1	10	43
1881	29	34	31	39	68	61	83	51	116	188	206	274	1,180
1882	271	224	201	123	88	34	16	3	4				964
Total	460	385	381	328	308	227	200	124	184	258	326	442	3,623

CONSOLIDATED REPORT OF THE IMMIGRANT-INSPECTION SERVICE IN MICHIGAN FOR THE YEAR ENDING MAY 31, 1883.

By H. R. MILLS, M. D., *Supervising Sanitary Inspector National Board of Health.*

To the President of the National Board of Health, Washington, D. C.:

SIR: I have the honor to forward herewith the consolidated report of the immigrant inspection service in Michigan for the year ending May 31, 1883:

Trains and boats inspected, Port Huron, 1,720; Detroit, 325.

Immigrants inspected, Port Huron, 52,701; Detroit, 30,935; total, 83,636.

Place of inspection, Port Huron and vicinity and Detroit and vicinity.

Names of ocean steamers and ports of departure and arrival. (See weekly reports.)

Arrived at Port Huron by Grand Trunk Railway, and departed by Grand Trunk and Canada Southern Grand Trunk Railways. Arrived at Detroit by Great Western and Canada Southern railways, and departed by Michigan Central and Detroit and Grand Haven Railways.

Nationality, Port Huron: 1. Canadians; 2. Scandinavians; 3. Germans; 4. Foreign English; 5. Italians; 6. Russians; 7. Poles; 8. Hollanders; 9. Irish; 10. Portugese; 11. Icelanders. Detroit: 1. Germans; 2. Scandinavians; 3. Foreign English; 4. Italians; 5. Poles; 6. Icelanders.

Destination: Largely to the West and Northwest, via Chicago; some scattering in the States, especially Michigan.

Sanitary condition of cars, poor.

Sanitary condition of passengers, generally fair.

Found protected by previous vaccination, Port Huron, 9,775; Detroit, 17,652; total, 27,427. Small-pox, Port Huron, 2,054; Detroit, 436; total, 2,490. Recent vaccination working, Port Huron, 627; Detroit, 1,319; total, 1,946. Total, Port Huron, 12,456; Detroit, 19,407; total, 31,863.

Vaccinated, primary, Port Huron, 2,784; Detroit, 251; total, 3,065. Re-vaccinated, Port Huron, 17,027; Detroit, 759; total, 17,786. Total, Port Huron, 19,811; Detroit, 1,040; total, 20,873; Detroit, unclassified, 22.

Passes examined and holders found protected, Port Huron, 4,491; Detroit, 17,968; total, 22,459.

Passes issued, Port Huron, 32,267; Detroit, 20,469; total, 52,736.

Passes withheld, Port Huron, 20,434; Detroit, 10,466; total, 30,900.

Dead on trains, Port Huron, 3; Detroit, not reported.

Sick on trains, Port Huron, 195; Detroit, 56; total, 251. We found among children diseases of the alimentary canal, measles, whooping-cough, and other diseases incident to childhood. Also many cases of injury among adults, continued fever, measles, and injuries of various kinds, all of which were attended to as opportunity would permit.

Cases of measles, Port Huron, 63; Detroit, 36; total, 99.

Whooping-cough, Port Huron, 4; Detroit, 3; total, 7.

To review briefly the history of this service, I beg leave to state that in consequence of the settled conviction among medical men and sanitarians that preventable contagious diseases, and especially small-pox, were being imported and spread by the agency of immigrants, and on account of the epidemic then prevailing extensively in Chicago and the Northwest, a convention of health officers and leading sanitarians from a large number of the States of the Union was held in Chicago in the latter part of June, 1881. After a thorough and careful investigation of the subject it was decided that the sanitary inspection of immigrants was an absolute necessity, and that the National Board of Health was the proper body to take charge of the work. After much seemingly unavoidable delay another convention of health officers and sanitarians was held in Port Huron in May, 1882, at which it was decided, at the urgent request of the State board of health, to begin the inspection at once; and Dr. Stephen Smith, of the National Board, who was present, proceeded to appoint inspectors and organize the force necessary. Two stations were ordered in Michigan, one at Port Huron and one at Detroit, and placed under the supervision of the State board of health.

INSPECTION SERVICE AT PORT HURON.

On the 15th of May, 1882, I was placed on duty by Dr. H. B. Baker, secretary of the State board of health of Michigan, with instructions to make such observations and gather such facts and items of information and make such arrangements as were essential to the beginning of regular train inspection on the first day of June.

During this preliminary work I found two cases of small-pox on immigrant trains; one on the 27th of May on a train from Quebec and another on the 29th day of May on train from New York. In both instances the stage of the disease indicated that the eruption must have been observable before their departure from the ports of debarkation, and that close scrutiny should have prevented the diseased persons from being taken on the trains.

There are practically three lines of railway coming into Port Huron from the East, viz: The main line of the Grand Trunk from Quebec and Portland; the Buffalo branch, which joins the main line at Stratford, Ontario, and the Great Western Division of the Grand Trunk, which was formerly the Great Western Railway from Niagara Falls. The first two of these roads bring the greater portion of the immigrants coming into the country via Port Huron. It was found on investigation that immigrants came on the regular as well as special trains, and hence it was necessary that *all* trains, both regular and special, should be inspected, in order that the work should be thoroughly done. Hence it became necessary to have inspectors on duty often from 4 o'clock and regularly at 5 o'clock in the morning until the last train arrived at night, usually at 8 o'clock, but often much later.

On the first day of June Drs. C. E. Spencer and C. B. Stockwell were placed on duty under my supervision, and the regular train inspection began. Owing, however, to the unforeseen delay in the receipt of virus, vaccination was not begun until June 10. During the month of June all persons having large typical scars, and those having had small-pox were passed as protected; but since the first day of July the rule has been to vaccinate all immigrants arriving in second and third class cars who have not had small-pox or who have not been satisfactorily vaccinated within five years.

When large special trains approach this station we have been informed in advance by telegraph, and inspectors have gone down the road and met them when there was opportunity. Otherwise the inspection has been made while crossing the river, and vaccination has been performed after arrival on the American side. When possible a thorough inspection of each individual has been made, regardless of the protection cards they may hold. When a person has been found properly protected by old vaccination, previous small-pox or recent vaccination working, a white *protection* card has been issued. If not found protected, vaccination has been performed, unless sickness existed or some other good reason why the individual should not be vaccinated, such as old age, feeble condition, pregnancy, or some other contra-indicating physical condition, and a red *vaccination* card has been issued. No one has been allowed to escape without a good reason. While we do not resort to compulsory vaccination, the arguments which are brought to bear on the passenger are generally sufficient. At present the inspection seems to be expected by those crossing here, and I judge from this that word has been sent back by former immigrants as to the regulations, and they come with their minds prepared.

During the season of navigation, immigrants arriving at this port are divided into three classes: The first, Canadian; the second, foreign, via Quebec; the third, foreign, via New York. The first comes by the main line of the Grand Trunk Railway from the provinces of Ontario, Quebec, Nova Scotia, New Brunswick, and the neighboring territory about the mouth of the Saint Lawrence. There are some peculiarities about this class worthy of note. It consists largely of the French element, and among them we see the evidence of the prevalence of small-pox in the numerous pock-marked faces which come to our notice. And again in this same class, and especially among the people from Cape Breton and Prince Edward's Island, we find a large number of unvaccinated adults. In fact, there prevails throughout the region from which this class comes a prejudice against vaccination. This was an obstacle which at first threatened to be a serious one, but which does not now seriously interfere with the work of vaccination.

While this prejudice against vaccination prevails, I am told by those familiar with their ways that they not unfrequently seek opportunities for exposing themselves and their children to the contagion of small-pox. This class is distributed through the lumber woods of Michigan and the Northwest. It comes into the country without undergoing any inspection or quarantine whatever until they reach the United States.

The second class comes principally from the north of Europe, and debarks at Point Levi, near Quebec, and also reaches this port via the main line of the Grand Trunk Railway. The Scandinavians predominate. I am told that a form of inspection is maintained by the authorities at Quebec, but no vaccination is practiced either on the lines of steamers running to this point or on their arrival at that port.

After the close of the season of navigation immigrants instead of coming to Quebec are landed at Halifax, Portland, Boston, or ports of entry farther south.

The third class comes mostly from Norway, Germany, and the south of Europe, and lands at Castle Garden, New York. The system of vaccination on board ships bringing immigrants to New York has been carried out more or less faithfully during the

year, but in many instances there has been gross neglect. When this class is inspected at this port it is found that a large percentage are unprotected and require vaccination.

In numerous instances individuals are found with protection cards in their possession who do not reveal the slightest sign of any vaccination whatever, and so far as I can learn the rule for revaccination if not vaccinated within five years is not acted upon.

Owing to the reduction of the number of inspectors at this station on and after December 15 to one only—on account of the near exhaustion of the funds at the disposal of the National Board—the work was very much crippled, and many immigrants passed into the country without having undergone a proper inspection.

THE INSPECTION SERVICE AT DETROIT.

While it is known that comparatively few immigrants make Detroit their port of entry, still it is also known that a large number pass through that city on their way westward from New York and other eastern ports. Hence it also became necessary to establish the inspection service at that point, and, in accordance with the orders of Dr. Stephen Smith, Drs. J. J. Mulheron and R. C. Teschan were appointed inspectors of the National Board of Health, to act under the supervision of the secretary of the State board.

Immigrants arriving at Detroit are similar in character to the third class of those arriving at Port Huron. They land at New York and reach Detroit on their way West by the Canada Southern or the Great Western Division of the Grand Trunk Railway. They come largely from Norway, Sweden, and Germany, and are scattered throughout the West and Northwest.

On the 15th of December, for the same reason that the force was reduced at Port Huron, the inspection was closed entirely at Detroit.

AT PORT HURON AND DETROIT.

Eighty-three thousand six hundred and thirty-six immigrants passed under the observation of the inspectors at Port Huron and Detroit during the year; the nationality being designated in order of the highest to lowest in point of numbers, beginning with the Canadians and ending with the Icelanders, as follows: At Port Huron, 1. Canadians; 2. Scandinavians; 3. Germans; 4. Foreign English; 5. Italians; 6. Russians; 7. Poles; 8. Hollanders; 9. Irish; 10. Portuguese; 11. Icelanders; and at Detroit, 1. Germans; 2. Scandinavians; 3. Foreign English; 4. Italians; 5. Poles; 6. Icelanders. Nearly all were destined to the Northwest via Chicago. Of these, 26,240 were passed by the inspectors on account of previous vaccinations, 2,482 on account of having had small-pox, and 1,813 on account of recent vaccinations working at the time of inspection, performed almost entirely on board the steamers arriving at New York.

In estimating the per cent. of those found unprotected and requiring vaccination, it must be remembered that 30,900 were inspected as to the presence of contagion only, without reference to susceptibility to the contagion of small-pox. This occurred on account of the want of a sufficient force of inspectors at times when two or more heavy trains arrived at or about the same hour. Hence, 52,736 must be the basis of this per cent. The table shows that 3,065 primary vaccinations were performed, largely among adults, 17,786 revaccinations, and 22 vaccinations not classified, making a total of 20,873 vaccinations of unprotected persons out of 52,736, being nearly 40 per cent. And we have no reason to believe that the 30,900 who were inspected only as to presence of contagion were any better protected than those who were more thoroughly examined. We therefore conclude that about 12,300 people who were unprotected and dangerous to the public health came into the country to become food for contagion on exposure, who should have been rendered secure against attack themselves and harmless to others.

A number of dead children were discovered on the trains, and 251 immigrants who were sick or disabled were found and cared for by the inspectors of the National Board. The causes of sickness were, among children, teething, diarrhoea, whooping cough, measles, and other diseases of childhood, and injuries; among adults, pneumonia, continued fever, measles, and injuries. The sanitary condition of the cars was for the most part poor; that of the passengers, in the main, fair.

After the experience of one year the utility of the inspection service is easily to be seen. Since its commencement valuable statistics have been gathered, and the importation of disease has been greatly diminished, the mere fact of the existence of the inspection becoming a safeguard.

This inspection not only furnishes an efficient means of warding off contagion, but an opportunity for establishing a thorough system of vaccination, and thus in a double way protects public health. As has before been said, these people arrive at

our ports of entry, many of them with a strong prejudice against vaccination, and if allowed to come into the country unvaccinated the opportunity will be lost, and in all probability will never occur again, for subjecting them to such control as can be exercised by the inspectors of the National Board of Health. But vaccination controls but one disease, one item in the list, small-pox. The protection of the country against the importation of any disease dangerous to public health is certainly a matter of great importance, and as all the States and Territories are equally interested, it would seem proper that this common foreign foe should be fought at the expense of the General Government. This importation is accomplished not only through the medium of diseased persons, but by infected articles of clothing or merchandise. Large quantities of rags are brought into this country every year from Europe and the provinces of Asia and Africa bordering on the Mediterranean. It is impossible to ascertain the number of deaths which annually occur in this country from diseases, the germs of which are imported in this manner. The inspection and disinfection or destruction of all suspected articles collected from the East should be rigidly enforced.

In view of the experience of the past year, by which we know that the inspection can be carried on and a vast amount of sanitary work accomplished without serious inconvenience to the traveling public, and that it will meet with a hearty co-operation of the railroad authorities; and in view of the threatenings that come from one direction and another of yellow fever, cholera, and small-pox, which forbode evil for the coming year, it becomes serious neglect on the part of the authorities, whose duty it is to provide protection, not to maintain any efficient barriers, in which the sanitarians of the country have confidence.

Very respectfully,

H. R. MILLS, M. D.,
Supervising Sanitary Inspector, N. B. H.

IMMIGRANT-INSPECTION SERVICE AT BALTIMORE, MD.

By JAMES A. STEUART, M. D., *Inspector National Board of Health.*NATIONAL BOARD OF HEALTH,
Baltimore, October 19, 1883.*Secretary National Board of Health:*

SIR: When the inspection service was first inaugurated in June, 1882, the influx of immigrants through the port of Baltimore was in full blast, and at the rate of about 600 or 1,000 per week. All were destined for the far West, where small-pox had been disseminated through them, and hundreds more of them, being unprotected by vaccination, furnished fresh food for the spread of this disease. It had been wisely determined, therefore, by the National Board of Health some time previously that an attempt should be made, through the appointment of medical inspectors at the principal ports on the Atlantic coast, to remedy the growing evil. It was ordered first, that no contagious disease should be allowed to enter said ports; second, that no immigrant, no matter of what age, should be permitted to land without satisfactory proof of having been previously and recently vaccinated or revaccinated. This last order, being peremptory and strictly carried out, necessitated one of three things, viz: That they should be vaccinated before embarkation, while on the voyage, or after arrival at their port of destination before being allowed to land. This at once produced the effect of causing the surgeons of the steamships bringing immigrants to insist as far as possible upon vaccination before embarkation, in order to save themselves labor during the voyage, and to vaccinate during the voyage all who had escaped previously, in order to avoid delay in landing and dispatching to the West these immense crowds of men, women, and children. The result of this admirable arrangement soon convinced the immigrants themselves, the agents of the steamship lines, and the surgeons of said ships, that satisfactory evidence of vaccination would be in all cases absolutely insisted upon.

At first I found about 25 per cent. requiring vaccination after arrival, and before landing, it soon fell to 10 and then to 5 per cent. of the total number. The plan carried out at this port (Baltimore) was that *every* individual must be provided with a card signed by the surgeon of the ship, certifying that the bearer had been duly vaccinated, and was therefore protected as far as vaccination was capable of protecting them from small-pox.

As an additional check and guarantee of the value of these "surgeons' vaccination certificates," it was my habit while examining and stamping each and every certificate, as the immigrants came one at a time through a single gangway from the ship to the wharf, to single out at irregular periods individuals for a personal examination, and to proceed according to the result of such examination. If found all right they were passed without delay, but if the contrary, the surgeons were called to account for a false certificate, and the person placed aside to be vaccinated before landing. This also had the effect of making the surgeons very careful, for they knew not when they might be exposed to the censure of the captain and agents of the line for this neglect of duty.

My experience has been that the German agents and surgeons are much more alive to the importance of this system, and united in the work with far more zeal and cheerfulness than the English. This was doubly fortunate, as the German immigration was and is ten times greater than the English.

The labor attending this inspection service was by no means an inconsiderable affair. To be in constant readiness to attend at a moment's notice, upon the arrival of the ships, and often kept waiting on the pier a whole day upon a false report of an approaching steamer, then to stand for two or three hours at the gangway, and examine from 600 to 1,400 immigrants in as rapid succession as possible, compatible with care, frequently proved laborious in the extreme.

This extraordinary care produced its good fruit also, in the general improved sanitary condition of the immigrant ships, as well as in the care exercised in permitting none to embark about whom there was the slightest suspicion of disease; this very personal examination with reference to vaccination bringing the surgeon into such close contact with each individual immigrant that an incipient eruption or other contagious disease could scarcely escape his observation. Throughout the whole year only one or two cases of actual existing small-pox reached the port of Baltimore; a few others had occurred on the voyage, slight cases, that were convalescing before arrival, and every soul on board had been thoroughly protected by vaccination. A few cases of measles, and one or two of diphtheria, were met with and cared for by isolation on the ship, and being sent to the hospital upon arrival. All cases of small-pox were sent at once to the hospital at quarantine.

It was a matter of extreme regret to me that this service should be suspended just as it had reached its highest point of usefulness. The agents and surgeons of the steamship lines had become thoroughly educated to its importance and workings and were taking a pride in meeting all our requirements. This had reached even the immigrant class themselves, and caused them in many cases to anticipate the demands of the surgeons and our rules. That even one year of this inspection service should have nearly extinguished the disease in the West, and upon all the great thoroughfare routes, from the principal Atlantic seaports to the West, is sufficient evidence of what the results would be were the service a permanent institution.

All experience has shown that small-pox as a disease to which flesh is heir cannot be totally destroyed in all parts of the world, but through the inestimable blessing of vaccination it can be subdued and kept at a minimum point, only by vigilance—sleepless and untiring vigilance.

Very respectfully,

JAMES A. STEUART, M. D.,
Inspector at Baltimore.

IMMIGRANT INSPECTION SERVICE AT PHILADELPHIA, PA.

By ROBERT KILDUFFE, M. D., *Sanitary Inspector National Board of Health.*

PHILADELPHIA, October 28, 1883.

SIR: I have the honor to submit the following report of the immigrant inspection service, established at the port of Philadelphia under my charge, in compliance with the requirements of act June 2, 1879, and additional rules and regulations necessary to prevent the introduction of small-pox into the United States from foreign countries, approved November 14, 1881:

Number of steamers arriving at this port.....	41
Number of passengers:	
American	1,621
Foreign	18,807
Total	20,428
Number of inspected and protected passengers	6,445
Number of vaccinations and revaccinations	2,474
Total	8,919

The small number of vaccinations is due to the fact that by a resolution of the local board of health, "vaccinations were not to be performed on any steamer arriving at this port unless said steamer has, or has had on the passage actual disease (small-pox) on board, or comes from an infected port."

This resolution I believe to have been passed under a misapprehension of the rules of the National Board.

It gives me great pleasure to report a marked improvement in the sanitary condition of both vessels and immigrants at the close of the service as compared with their condition at its opening. The marked benefit of the inspection service being shown in the greater care exercised by both captains and surgeons over the vessels and passengers under their charge, and it is with great satisfaction I report the courtesy which was always shown me by these gentlemen, and the efficient aid rendered me by them in the performance of my duties.

My work was greatly facilitated by the cordial co-operation of the steamship lines, who afforded me every assistance and posted notices in different languages on board the steamers relative to vaccination for the information of their passengers.

I am also greatly indebted to the port physician (Dr. Philip Leidy) for prompt notification of the arrival of steamers and the use of tug in boarding the same.

In concluding my report, I feel that I should fail in my duty were I to omit to express my conviction of the importance of the immigrant inspection service in preventing the introduction of small-pox into Philadelphia from foreign ports and its spread to other parts of our country, and my regret that it should have been closed just at a time when, all the difficulties and delays incident to a new undertaking having been surmounted, it was becoming capable of more thorough and effective work, promising important results in the future.

I have the honor to be, sir, very respectfully, your obedient servant,

ROBERT KILDUFFE, M. D.,

Sanitary Inspector National Board of Health.

JAMES L. CABELL, M. D.,

President National Board of Health, Washington, D. C.

REPORT ON "IMMIGRANT-INSPECTION SERVICE" AT PITTSBURGH, PA.,
FROM JUNE 10 TO SEPTEMBER 30, 1882.

By W. SNIVELY, M. D.

Immediately upon accepting the appointment of sanitary inspector of the National Board of Health at this station, I endeavored to inform myself as thoroughly as possible regarding the nature of the duties connected with the inspection of immigrants in transit by railroad. I found that the work would be limited to one road, the Pennsylvania Central;* that the through trains from the East generally arrived during the afternoon and evening; that the train carrying immigrants was divided into one, two, and three sections, as the exigencies of transportation demanded; that these sections, where possible, followed one another as closely as the rules regulating the running of trains would permit, and that the average speed when running on schedule time was about 30 miles per hour.

In the light of this information I deemed assistance necessary, and accordingly secured the services of Dr. Adolph König, to whom I am largely indebted for whatever of thoroughness may have characterized the work done at this point.

Our first object must be to intercept the approaching trains at a point as distant from the city as possible, in order to obtain the maximum of time for inspection and vaccination. Blairville intersection, 53 miles east of Pittsburgh, proved to be the point at which we could generally intercept the approaching trains; but it not infrequently happened that we were obliged to stop short of this point, and occasionally we could proceed as far as Johnstown, 78 miles east of Pittsburgh.

Without the co-operation of the railroad officials, particularly the employés of the telegraph department, the work of inspection would have been impracticable; and I desire, in this connection, to express my thanks to all connected with the Pennsylvania Railroad for the uniform courtesy which characterized our intercourse during the inspection service—a period of one hundred and twelve days.

On the inauguration of the service it was found that many of the immigrants carried much of their baggage with them, which being piled in the aisles of the cars, rendered it exceedingly difficult to pass through. This was soon remedied. Again, the water-tanks would invariably be found empty, and many of the passengers, children especially, suffering from thirst. Marked improvement in this respect was soon observable. The water-closets were generally found offensive, although it is but just to state that this condition of affairs was in a measure dépendent upon the *esprit* of the immigrants themselves.

The time available for inspection of trains averaged about two hours, but the work to be performed in this time varied greatly from one car of 27 passengers to a train of eight cars carrying 436.

As a majority of the immigrants were provided with protection cards issued by the steamship surgeons, and as my letter of instructions directed me to examine and indorse such cards, the work of personal inspection was very much reduced; but so much time was lost waiting for cards to be found that it would perhaps have been wiser to have discarded them in favor of general personal inspection. It is probable that by so doing many more would have been vaccinated, as it is possible that many of those provided with cards were unprotected.

The vaccine material employed was bovine virus, obtained through the local board of health from the New England Vaccine Company, of Chelsea, Mass. No revaccinations were made, as the limited time at our disposal would not always permit, and the immigrants strenuously objected to it, although in but a very few instances did they object to primary vaccination. As shown by the annexed tabular statement, 66 per cent. of our vaccinations were of children. Unvaccinated infants suffering from syphilis, scrofula, measles, &c., or when seriously reduced by diarrhœa—which prevailed extensively among them during the warm weather of June, July, and August—were permitted to pass. Two deaths from causes above indicated occurred. We prescribed to the best of our ability for all the sick, especially children, but the exigencies of rapid transit would not admit of necessary rest.

The most difficult to manage were the English, Irish, Hollanders, Poles, and Russians. The most tractable were the Danes, Swedes, Norwegians, French, Italians, and the German-speaking races. But few of other nationalities were encountered.

I am unable to furnish any intelligence regarding the results of our vaccinations. At least one-third of all immigrants passing over this route stopped permanently or temporarily at Pittsburgh, but it was impossible to trace them, as the largest number

* Only an occasional family or group of immigrants arrive over the Pittsburgh division of the Baltimore and Ohio Railroad.

immediately dispersed throughout the bituminous coal regions of Western Pennsylvania, Eastern Ohio, and West Virginia, to seek work in the mines, factories, and furnaces.

One train of five cars, carrying 202 passengers, passed this station at 5 o'clock a. m. September 25. It had been delayed by storms on the New Jersey division, and the railroad officials in this city seemed to have had no intimation of its coming. It was consequently uninspected.

The annexed tabular statement exhibits at a glance the work performed during the sixteen weeks of service.

Respectfully submitted.

W. SNIVELY, M. D.

Week ending—	Number of trains.	Number of cars.	Immigrants.		Total.
			Adults.	Children.	
June 16	7	32	1,093	215	1,308
23	8	45	1,583	270	1,853
30	7	35	1,235	272	1,507
July 7	6	37	1,431	281	1,712
14	7	36	1,275	259	1,534
21	7	34	1,158	285	1,443
28	6	30	1,013	210	1,223
Aug. 4	6	29	819	189	1,008
11	6	23	671	141	812
18	6	26	847	216	1,063
25	6	24	780	214	994
Sept. 1	6	24	733	253	986
8	6	22	647	165	812
15	7	31	953	261	1,214
22	7	21	603	177	780
30	6	22	714	200	914
	104	471	15,555	3,608	19,163

Week ending—	Cards indorsed.	Personally inspected.	Vaccinated.		Total.
			Adults.	Children.	
June 16	1,117	191	11	14	25
23	1,348	505	30	40	70
30	1,215	292	18	26	44
July 7	1,419	293	6	35	41
14	1,241	293	7	26	33
21	1,277	166	10	27	37
28	1,044	179	6	16	22
Aug. 4	746	262	6	16	22
11	613	199	14	21	35
18	803	260	16	25	41
25	692	302	14	19	33
Sept. 1	594	392	15	38	53
8	558	254	6	30	36
15	946	268	26	36	62
22	482	298	24	14	38
30	781	133	6	30	36
	14,876	4,287	215	413	628

IMMIGRANT INSPECTION SERVICE AT NEW YORK.

BY ELISHA HARRIS, M. D.

STATE BOARD OF HEALTH OF NEW YORK,
Albany, October 2, 1883.

MY DEAR SIR: Pressure of duties compels me to make my reply to your request very brief.

As you may already know, the State board of health of New York has kept the subject of immigrant sanitation and the suppression of exotic diseases constantly under its official supervision from the time the work of this board began, in the summer of 1880. The health officer of the port being a member *ex officio* of the board, and the executive commissioner and secretary of the board having spent many years in the quarantine service, and originated the reforms of the hospitals and methods of the New York quarantine, no failure to provide against the infectious maladies of immigrants could be justified by this board.

In various communications to the National Board in 1881 and 1882, the views and some of the efforts of this State board were fairly set forth, and early in August, 1881, a plan of co-operation with the National Board was submitted to that body, and its chairman on national and inter-State quarantine regulations. That chairman, Dr. Stephen Smith, had visited Chicago to confer with Western State health officials on behalf of the New York board, while acting as a member of the National Board. Dr. Smith's report at that time and certain propositions which this board submitted through him, at the Chicago conference, June 30, 1881, were transmitted by me to the National Board in August, 1881.

The ultimate organization of the inter-State and the national work was a realization of the purposes and efforts of the New York State board of health, which had been continued for nearly two years. In these efforts the board has steadfastly advocated the nationalization of the inter-State inspections and a system of temporary or extemporized hospital care. No. 27 of this board's circulars was originally designed to facilitate the care which local health boards should be prepared to give when hospital care might become necessary. Not less than twelve such refuges were prepared and still are available for exigencies which sick immigrants and other badly-housed persons, when dangerously sick, may present.

The prompt and munificent response of the National Board to offer its aid to the inter-State work gave great pleasure to this State board. The work was begun and it ended without becoming dependent upon the National Board, yet the aid offered and accepted became a token of substantial and esteemed co-operation. Since the constant inspections ceased, in December, 1882, this board has kept up occasional and tentative sanitary surveillance upon the immigrant passenger trains on the great railway trunk lines in the State of New York; yet the conclusion is that, so great has been the improvement in the sanitary protection, especially in vaccination, of emigrants at ports of departure in Europe, on shipboard, and at the ports of debarkation, that already we witness, in a large way, some of the best of the results we desired and helped to secure in the immigrant inspections. In this work the board of health of New York has steadfastly maintained and will ever assert that the central national sanitary system—its Board of Health of the United States—at Washington, is a public necessity, required in the interest of the nations, and of our American States and cities, for the common protection of human life among all classes, and most notably, among the most homeless and unsettled, whose misfortunes and any calamity of contagious sickness makes them a public burden and a measureless personal and family affliction to the sufferers and their friends. We say unreservedly that the demands of humanity and the comity of nations, now and evermore, must require the existence of a national sanitary system.

The State board of health of New York is now, and may for years continue to be, charged with the duty of seeking and gratuitously offering all the information it can usefully apply or impart concerning the sanitary condition and wants of the immigrants who pass into and through the State. And his duty continues to require frequent inspection of emigrant trains, and the emigrants who are found at the termini of railroad routes in the State. Yet, for the present, since the withdrawal of the National Board's pecuniary resources, the State of New York may be alone in this kind of duty, though it seeks co-operation.

This board has addressed its requests and instructions to railway authorities and marked improvements are already witnessed in the sanitary and general care of the emigrant passengers on railroad lines in this State. Circular No. 60 is found and respected in every railway station of the emigrant-carrying roads. It is in the following language:

[No. 60.]

STATE BOARD OF HEALTH OF NEW YORK,
Albany, May 12, 1883.

To _____,
_____ Railway:

SIR: At the annual meeting of this board, May 9, the following preamble and resolution were adopted at the conclusion of a review of the evidence that greater attention to the sanitary requirements of emigrant trains is needed:

"Whereas the public health in this State and throughout the country is endangered by any neglect to enforce cleanliness and the necessary sanitary policing in companies of immigrants and in railway cars in which they are transported: Therefore,

"Resolved, That the State board of health of New York hereby earnestly requests the railroad authorities, and other transportation officers and attendants, to cause the strictest attention practicable to the cleanliness and sanitary supervision of the foreign immigrants who enter or pass through this State, especially to the effectual sanitary policing of cars and baggage, as well as of persons, the regulated and thorough ventilation of the same, and the provision of adequate means for personal cleanliness, for pure water, and for necessary medical and surgical care of the immigrant passengers."

In transmitting to you this information and the board's request, it is important that all emigrant train conductors, and the passenger and station agents, should know that the local board of health in each city, village, and town is the authorized sanitary authority to which any notice or appeal for official orders, or means for obtaining or providing sanitary protection of passengers and of trains and stations should be presented; and that in extreme cases, or as regards passenger trains, moving, the State board of health may be consulted by telegraph, with a view to insure prompt action at the proper places.

As this board has satisfactorily tested the utility of sanitary regulations for the emigrant trains, and has proved the willingness and ability of local boards of health to aid in doing whatever is necessary for the public health, it will, on all proper occasions, co-operate with and sustain the local sanitary officers in duties required and health regulations enforced at the railway stations.

Whenever an exigency shall require that instant sanitary advice or orders be given on a proposed arrival at any station upon a railway, the train-master's request should be telegraphed at once to the station agent and the health officer at the proposed stopping place, as well as to the State board of health.

Respectfully,

E. M. MOORE, *President.*
ELISHA HARRIS, *Secretary.*

This is not enough. We ought to know the sanitary condition of all emigrant cars and their inmates.

In the five months ending December 1, 1882, the emigrant train inspectors, Drs. Perry and Trumbull, under this board, were in part, for a time, under pay from the National Board, and performed an amount of useful service which the annexed statistical statement imperfectly sets forth.

H. Ex. 43—10

146 ANNUAL REPORT OF THE NATIONAL BOARD OF HEALTH.

Exhibit of inspections showing emigration over New York Central and New York, Lake Erie and Western Railroad, for six months ending November 30, 1883.

[Compiled from weekly reports from Inspectors Perry and Trumbull.]

Months.	Number of cars.	Number of passengers.	Number of sick.	Number never vaccinated.	Number of deaths.
New York Central and Hudson River Railroad:					
June	262	13,967	4	0	1
July	225	9,369	1	0	0
August	199	7,296	0	2	1
September	277	10,341	2	11	0
October	196	7,064	2	25	1
November	208	7,747	1	11	0
Total	1,467	53,724	10	49	3
New York, Lake Erie and Western Railroad:					
June	249	10,052	4	2	0
July	168	6,373	10	0	0
August	127	5,226	7	0	0
September	156	6,398	3	2	1
October	132	5,185	2	8	0
November	114	4,506	5	0	0
Total	949	37,696	31	12	1
Total both divisions	2,414	91,420	41	61	

For the details of experience of this board and its inspectors in this work, I must refer you to the files of papers I have sent to your central office.

Please present the assurances of confidence and great esteem of this board to the members of the National Board who know of this communication. I write it for the information of the president of that board.

With great regards to you, my dear sir,

ELISHA HARRIS,
Commissioner and Secretary

APPENDIX D.

LAWS RELATING TO THE NATIONAL BOARD OF HEALTH.

AN ACT to prevent the introduction of infectious or contagious diseases into the United States, and to establish a National Board of Health.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there shall be established a National Board of Health to consist of seven members, to be appointed by the President, by and with the advice and consent of the Senate, not more than one of whom shall be appointed from any one State, whose compensation, during the time when actually engaged in the performance of their duties under this act, shall be ten dollars per diem each and reasonable expenses, and of one medical officer of the Army, one medical officer of the Navy, one medical officer of the Marine Hospital Service, and one officer from the Department of Justice, to be detailed by the Secretaries of the several Departments and the Attorney-General, respectively, and the officers so detailed shall receive no compensation. Said board shall meet in Washington within thirty days after the passage of this act and in Washington or elsewhere from time to time upon notice from the president of the board, who is to be chosen by the members thereof, or upon its own adjournments, and shall frame all rules and regulations authorized or required by this act, and shall make or cause to be made such special examinations and investigations at any place or places within the United States, or at foreign ports, as they may deem best, to aid in the execution of this act and the promotion of its objects.

SEC. 2. The duties of the National Board of Health shall be to obtain information upon all matters affecting the the public health, to advise the several Departments of the Government, the executives of the several States, and the Commissioners of the District of Columbia, on all questions submitted by them, or whenever, in the opinion of the board, such advice may tend to the preservation and improvement of the public health.

SEC. 3. That the board of health, with the assistance of the Academy of Science, which is hereby requested and directed to co-operate with them for that purpose, shall report to Congress at its next session a full statement of its transactions, together with a plan for a national public health organization, which plan shall be prepared after consultation with the principle sanitary organizations and the sanitarians of the several States of the United States, special attention being given to the subject of quarantine, both maritime and inland, and especially as to regulations which should be established between State or local systems of quarantine and a national quarantine system.

SEC. 4. The sum of fifty thousand dollars, or so much thereof as may be necessary, is hereby appropriated to pay the salaries and expenses of said board and to carry out the purposes of this act.

Approved, March 3, 1879.

AN ACT to prevent the introduction of contagious or infectious diseases into the United States.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That it shall be unlawful for any merchant ship or vessel from any foreign port where any contagious or infectious disease exists, to enter any port of the United States except in accordance with the provisions of this act, and all rules and regulations of State boards of health and all rules and regulations made in pursuance of this act; and any such vessel which shall enter, or attempt to enter, a port of the United States, in violation thereof, shall forfeit to the United States a sum, to be awarded in the discretion of the court, not exceeding one thousand dollars, which shall be a lien upon said vessel, to be recovered by proceedings in the proper district court of the United States. And in all such proceedings the United States district attorney for such district shall appear on behalf of the United States, and all such proceedings shall be conducted in accordance with the rules and laws governing cases of seizure of vessels for violation of the revenue laws of the United States.

SEC. 2. All such vessels shall be required to obtain from the consul, vice-consul, or other consular officer of the United States at the port of departure, or from the medical officer, where such officer has been detailed by the President for that purpose, a certificate in duplicate setting forth the sanitary history of said vessel, and that it has in all respects complied with the rules and regulations in such cases prescribed for securing the best sanitary condition of the said vessel, its cargo, passengers, and crew - and said consular or medical officer is required, before granting such certificate, to be satisfied the matters and things therein stated are true; and for his services in that behalf he shall be entitled to demand and receive such fees as shall by lawful regulation be allowed, to be accounted for as is required in other cases.

That upon the request of the National Board of Health the President is authorized to detail a medical officer to serve in the office of the consul at any foreign port for the purpose of making the inspection and giving the certificates hereinbefore mentioned: *Provided*, That the number of officers so detailed shall not exceed at any one time six: *Provided further*, That any vessel sailing from any such port without such certificate of said medical officer, entering any port of the United States, shall forfeit to the United States the sum of five hundred dollars, which shall be a lien on the same to be recovered by proceedings in the proper district court of the United States. And in all such proceedings the United States district attorney for such district shall appear on behalf of the United States, and all such proceedings shall be conducted in accordance with the rules and laws governing cases of seizure of vessels for violation of the revenue laws of the United States.

SEC. 3. That the National Board of Health shall co-operate with and, so far as it lawfully may, aid State and municipal boards of health in the execution and enforcement of the rules and regulations of such boards to prevent the introduction of contagious or infectious diseases into the United States from foreign countries, and into one State from another; and at such ports and places within the United States as have no quarantine regulations under State authority where such regulations are, in the opinion of the National Board of Health, necessary to prevent the introduction of contagious and infectious diseases into the United States from foreign countries, or into one State from another; and at such ports and places within the United States where quarantine regulations exist under the authority of the State, which, in the opinion of the National Board of Health, are not sufficient to prevent the introduction of such diseases into the United States, or into one State from another, the National Board of Health shall report the facts to the President of the United States, who shall, if, in his judgment, it is necessary and proper, order said Board of Health to make such additional rules and regulations as are necessary to prevent the introduction of such diseases into the United States from foreign countries, or into one State from another, which, when so made and approved by the President, shall be promulgated by the National Board of Health and enforced by the sanitary authorities of the States, where the State authorities will undertake to execute and enforce them; but if the State authorities shall fail or refuse to enforce said rules and regulations the President may detail an officer or appoint a proper person for that purpose.

The board of health shall make such rules and regulations as are authorized by the laws of the United States and necessary to be observed by vessels at the port of departure and on the voyage where such vessels sail from any foreign port or place at which contagious or infectious disease exists, to any port or place in the United States, to secure the best sanitary condition of such vessel, her cargo, passengers, and crew, and when said rules and regulations have been approved by the President they shall be published and communicated to, and enforced by, the consular officers of the United States: *Provided*, That none of the penalties herein imposed shall attach to any vessel or any owner or officer thereof, till the act and the rules and regulations made in pursuance thereof shall have been officially promulgated for at least ten days in the port from which said vessel sailed.

SEC. 4. It shall be the duty of the National Board of Health to obtain information of the sanitary condition of foreign ports and places from which contagious and infectious diseases are or may be imported into the United States, and to this end the consular officers of the United States at such ports and places as shall be designated by the National Board of Health shall make to said board of health weekly reports of the sanitary condition of the ports and places at which they are respectively stationed, according to such forms as said board of health may prescribe; and the board of health shall also obtain, through all sources accessible, including State and municipal sanitary authorities throughout the United States, weekly reports of the sanitary condition of ports and places within the United States; and shall prepare, publish, and transmit to the medical officers of the Marine Hospital Service, to collectors of customs, and to State and municipal health officers and authorities, weekly abstracts of the consular sanitary reports and other pertinent information received by said board; and shall also, as far as it may be able, by means of the voluntary co-operation of State and municipal authorities, of public associations and private

persons, procure information relating to the climatic and other conditions affecting the public health; and shall make to the Secretary of the Treasury an annual report of its operations, for transmission to Congress, with such recommendations as it may deem important to the public interests; and said report, if ordered to be printed by Congress, shall be done under the direction of the Board.

SEC. 5. That the National Board of Health shall, from time to time, issue to the consular officers of the United States, and to the medical officers serving at any foreign port, and otherwise make publicly known, the rules and regulations made by it and approved by the President, to be used and complied with by vessels in foreign ports for securing the best sanitary condition of such vessels, their cargoes, passengers, and crews, before their departure for any port in the United States, and in the course of the voyage; and all such other rules and regulations as shall be observed in the inspection of the same on the arrival thereof at any quarantine station at the port of destination, and for the disinfection and isolation of the same, and the treatment of cargo and persons on board, so as to prevent the introduction of cholera, yellow fever, or other contagious or infectious diseases; and it shall not be lawful for any vessel to enter said port to discharge its cargo, or land its passengers, except upon a certificate of the health officer at such quarantine station, certifying that said rules and regulations have in all respects been observed and complied with, as well on his part as on the part of the said vessel and its master, in respect to the same and to its cargo, passengers, and crew; and the master of every such vessel shall produce and deliver to the collector of customs at said port of entry, together with the other papers of the vessel, the said certificates required to be obtained at the port of departure, and the certificate herein required to be obtained from the health officer at the port of entry.

SEC. 6. That to pay the necessary expenses of placing vessels in proper sanitary condition to be incurred under the provisions of this act, the Secretary of the Treasury be, and he hereby is, authorized and required to make the necessary rules and regulations, fixing the amount of fees to be paid by vessels for such service, and the manner of collecting the same.

SEC. 7. That the President is authorized, when requested by the National Board of Health, and when the same can be done without prejudice to the public service, to detail officers from the several Departments of the Government, for temporary duty, to act under the direction of said Board, to carry out the provisions of this act; and such officers shall receive no additional compensation except for actual and necessary expenses incurred in the performance of such duties.

SEC. 8. That to meet the expenses to be incurred in carrying out the provisions of this act, the sum of five hundred thousand dollars, or so much thereof as may be necessary, is hereby appropriated, to be disbursed under the direction of the Secretary of the Treasury on estimates to be made by the National Board of Health, and to be approved by him. Said National Board of Health shall, as often as quarterly, make a full statement of its operations and expenditures, under this act, to the Secretary of the Treasury, who shall report the same to Congress.

SEC. 9. That so much of the act entitled "An act to prevent the introduction of contagious or infectious diseases into the United States," approved April twenty-ninth, eighteen hundred and seventy-eight, as requires consular officers, or other representatives of the United States, at foreign ports, to report the sanitary condition of and the departure of vessels from such ports to the Supervising Surgeon General of the Marine Hospital Service; and so much of said act as requires the Surgeon General of the Marine Hospital Service to frame rules and regulations, and to execute said act, and to give notice to Federal and State officers of the approach of infected vessels, and furnish said officers with weekly abstracts of consular sanitary reports, and all other acts and parts of acts inconsistent with the provisions of this act be, and the same are hereby, repealed.

SEC. 10. This act shall not continue in force for a longer period than four years from the date of its approval.

Approved June 2, 1879.

AN ACT to provide office-rooms for the National Board of Health, and for the publication of its reports and papers, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the National Board of Health is hereby authorized and empowered to procure suitable and sufficient offices in the city of Washington for the transaction of its business, at a rental not to exceed the sum of one thousand eight hundred dollars per annum. And said Board is also authorized to pay the sum of two hundred and twenty-five dollars for the rent of building number fourteen hundred and five G street, northwest, in the city of Washington, used by the National Board of Health for offices, from the third day of April, eighteen hundred and seventy-nine, to the third day of July, eighteen hundred and seventy-nine.

SEC. 2. That the necessary printing of the National Board of Health be done at the Government Printing Office, upon the requisition of the Secretary of the Board, in the

same manner and subject to the same provisions as other public printing for the several Departments of the Government: *Provided*, That the cost of said printing shall not exceed the sum of ten thousand dollars per annum.

SEC. 3. That the National Board of Health is hereby authorized and empowered to have printed and bound ten thousand copies of the report of the Board of Medical Experts created by former act of Congress, which report shall include the report of Doctors Bemiss and Cochran and Engineer Hardee, upon the yellow-fever epidemic of eighteen hundred and seventy-eight; six thousand copies of the same to be furnished the House of Representatives, two thousand copies to the Senate, and the residue to the National Board of Health: *Provided*, That the cost of publication and binding said report shall not exceed the sum of seven thousand five hundred dollars. And the said Board is hereby authorized to pay Doctors Bemiss and Cochran and Engineer Hardee ten dollars per day, for the preparation of their said report, for the period of two months: *Provided*, That the same shall be completed and submitted to the Board within that time.

SEC. 4. That the National Board of Health is hereby authorized and directed to pay to Frank J. Taylor, for services as stenographer to the Board of Medical Experts in reporting evidence of medical men and others touching the causes, introduction, and spread of epidemic diseases within the United States, and for preparing the same for publication, the sum of five hundred and forty dollars, said sum being the amount allowed him by the Committee on Epidemic Diseases.

SEC. 5. That the chief clerk of the National Board of Health shall act as disbursing agent for the Board, and shall give bond, conformably to section one hundred and seventy-six of the Revised Statutes, for the faithful performance of that duty, and for such service he shall receive three hundred dollars per annum, in addition to his salary as chief clerk, and the Board of Health may, with the approval of the Secretary of the Treasury, pay to its secretary such sum, in addition to his pay as a member of the Board, as it may deem proper, not exceeding one hundred dollars per month.

SEC. 6. That section three of the act approved June second, eighteen hundred and seventy-nine, entitled "An act to prevent the introduction of contagious or infectious diseases within the United States," be amended as follows: At the end thereof insert: "And the Board of Health shall have power, when they may deem it necessary with the consent and approval of the Secretary of the Treasury as a means of preventing the importation of contagious or infectious diseases into the United States, or into one State from another, to erect temporary quarantine buildings and to acquire on behalf of the United States, titles to real estate for that purpose, or to rent houses, if there be any suitable, at such points and places as are named in such section."

SEC. 7. That all the money hereinbefore authorized to be expended, and all contracts made and liabilities incurred by the National Board of Health shall be paid out of the appropriation of five hundred thousand dollars made in the act of Congress entitled "An act to prevent the introduction of contagious or infectious diseases into the United States," approved June second, eighteen hundred and seventy-nine.

Approved, July 1, 1879.

APPENDIX E.

CONSULAR AND MISCELLANEOUS REPORTS.

1. REPORT ON CHOLERA IN JAPAN, BY DR. D. B. SIMMONS, CHAIRMAN OF THE FOREIGN BOARD OF HEALTH, YOKOHAMA.
2. DISTOMA RINGERI AND PARASITICAL HEMOPTYSIS, BY DR. PATRICK MANSON, HONG KONG, CHINA. REPORT AND NOTES ON FILARIA DISEASE, BY DR. MANSON.
3. PROBABILITIES OF CHOLERA IN EUROPE.
4. REPORT ON CHOLERA IN SHANGHAI, FROM 1862 to 1833, BY EDWARD HENDERSON, M. D , ETC., HEALTH OFFICER.
5. REPORT ON EPIDEMIC OF TYPHOID FEVER AT LIEGE.
6. REPORT ON TREATMENT OF LEPROSY AT MARACAIBO.
7. REPORT ON BERI-BERI IN CEYLON.
8. REPORT ON CHEMICAL TREATMENT OF SEWAGE IN BERLIN.

CHOLERA EPIDEMIC IN JAPAN, WITH A MONOGRAPH ON THE INFLUENCE OF THE HABITS AND CUSTOMS OF RACES ON THE PREVALENCE OF CHOLERA.

BY D. B. SIMMONS, M. D.,

Physician and Surgeon to the Ken Hospital, one of the physicians to the Cholera Lazaret, and chairman of the Yokohama Foreign Board of Health.

EPIDEMICS PRIOR TO THAT OF 1877.

INTRODUCTION.—Macpherson, a well-known writer on cholera, says that it is "one of the oldest diseases whereof a distinct description exists," and that there are "few disorders respecting which such an uninterrupted chain of evidence has been preserved." Granting this, when we come to review the literature of the subject, especially that part of it which has reference to Eastern Asia, we are at once struck with the small number of wide-spread epidemics which are recorded as having penetrated thither from early times, as compared with those which traveled in an opposite direction, and often arrived even in the heart of Europe. Why China and Japan, situated eastward of the Indian source of the scourge, should have escaped its visitations when it ravaged Beloochistan, Persia, Arabia, and other countries to the west, is not at first glance apparent. Certainly the natural barriers in the former direction are not more formidable than those in the latter; while the habits of the people of China, and the condition of the walled towns into which many of them are crowded, would seem to be eminently adapted to foster and propagate the malady. A question which naturally suggests itself here is: Can this exemption be real, or is it only apparent? and I think that a solution is within reach. One author, on the subject of cholera in the far East, says: "Its literature in the annals of those countries is exceedingly meagre; and the earlier writings which do exist on the migratory and contagious character of the disease have heretofore escaped all but cursory notice." The explanation which he offers is that "exact knowledge of the branches of medicine is more rare" in China and Japan, "where the received opinions in regard to epidemics of any kind, from the nature of the subject, would be founded upon superstition and supernatural manifestations." For my own part, I think that there is good ground for the belief that lack of evidence of numerous visits of the evil is fair negative proof of the infrequency of its appearance, especially in countries so rich in historic records as are the two remotest empires of the Orient. Admitting this, and, in the case of China at least, many apparent predisposing inducements* to the introduction

* The fact that this year, while Japan has been overrun by a disastrous epidemic, her densely populous neighbor, still nearer to the cradle of the disease, has escaped, has led me to consider whether these "inducements" may not, after all, be more apparent than real. The present, however, is not the place for the consideration of a subject, which is of sufficient interest and importance to call for a chapter to itself.

and spread of cholera, an explanation may be found in the utter insignificance of the flow of life eastward from India, as compared with the enormous migrations, commercial, religious, and military, which for centuries streamed in the contrary direction from the country where Asiatic cholera is born. For generations the flood tide of travel tended westward, in caravans of merchants and pilgrims, toiling wearily onward, and armies moving still more slowly. These are the universally recognized means for the spread of disease by land. Their fatal work was also supplemented by sea through fleets of crowded and imperfectly equipped coasting vessels, whose course much more rarely lay in the direction of these waters. It will further be observed that epidemic cholera seems to have become far more prevalent in these regions in modern than it was in ancient times, a fact which I venture to explain by the much more frequent and rapid communication that now exists between its Indian home and lands nearer to the rising sun. The western advantages of steam transit conferred upon their peoples have probably been for something in the transport of the seed of the great zymotic destroyer, in a fructifying state, by way of intervening islands and peninsulas, to the shores of China and this still more distant empire.

CHINA.—As the history of cholera in Japan is intimately dependent upon the presence of the same disease on the near mainland, I will briefly review what has been chronicled concerning epidemics in China, before I proceed to notice its known visits to these islands. The first mention which I have been able to find of cholera prevailing in China as an epidemic disease is made by Cleyer,* who states that it appeared in 1669, and that it had probably been brought from Malacca. The next notice is by Gentil,† who, in his *Voyage aux Indes Orientales*, alludes to cholera as being in the Coromandel in 1761 and 1769, and states that shortly after the latter date it was present in China. The epidemic of 1817, which had its origin in Bengal, extended up the Ganges as far as Allahabad; and up the Bramapootra from Dacca, northeast to Rimpore, whence it traveled to the borders of Thibet and southwestern China. In 1820 it again appeared in the latter country—first at Canton. This particular epidemic originated on the eastern coast of Hindustan; thence it was carried by English troops to Burmah, during the war with that nation; thence to Bangkok and Canton, from which foot it penetrated into the interior of China, by direct route. Again radiating to Ningpo, and following the course of the Yangtze, it traveled by this track also into the very heart of the empire. In 1821 it reached Peking, where it reproduced itself in 1822 and 1823, and formed the center of infection in Northern Asia. In 1826 it was again borne from India to China. It once more reached Peking, whence, steadily advancing, it crossed the Chinese wall, swept through Mongolia, and eventually traveled to Moscow. In 1840 the Government of India dispatched a combined European and native army to China in the interest of the opium trade.‡ This force carried with it the seeds of cholera, which not only arrived at Peking, but followed the track of the caravans westward as far as Russia. In the statistical report of the health of the British Navy for 1868, we find that in 1841 the disease appeared in a malignant form in Ningpo, and that in 1842-'43 it was more than usually prevalent in the British East India squadron. For the next fifteen years no record appears of the disease in an epidemic form in any part of China. In 1858, however, it again appeared, according to the last-quoted report, and continued to do so year after year until 1867. Twice during this period it reached Japan, once in 1858 and again in 1861-'62. Between 1867 and 1877 there is no account of any epidemic of the disease in any part of this country or the adjacent empire.

An interesting notice of cholera epidemics in Peking, and of Chinese descriptions of the nature and treatment of the disease, will be found in Dr. John Dudgeon's Report on the Physical Conditions of Peking (pp. 39 and 40 of Imperial Chinese Customs Medical Reports for April-September, 1872).

JAPAN.—In this empire, as in China, we find the early history of cholera quite obscure. Kaempfer speaks of it vaguely as "frequent and fatal," but does not record the history of any particular epidemic; and, indeed, the diversity in the dates assigned to even recent periods of its appearance by the most reliable sources of direct information would render it, if we were simply dependent upon them for guidance, extremely hazardous to attempt to decide with even approximate certainty upon the times of its visitations; but a comparison of local accounts with the chronicles of the disease in other parts of Eastern Asia, its usual source of importation hither, will enable us partially to overcome this difficulty. One Japanese authority gives 1817, 1854, and 1861-'62 as years when epidemics occurred, while another fixes the dates 1819, 1821-'22, and 1858-'59 as pestilential seasons. Although the great epidemic of 1817 had its origin in India in that year, it did not reach Java until 1819, and China until 1820. These being the only points in Eastern Asia in communication with Japan at that time, its prevalence here could not have been earlier than 1819. The dates 1821-'22 are undoubtedly correct, since the disease was epidemic along the whole China coast during that period, as already stated. Respecting the year 1854, availa-

* Cholera Epidemic of 1873 in the United States, p. 525. † Ibid., p. 527. ‡ An unwritten chapter.



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ble information is conflicting. Some of the oldest and most intelligent native doctors, including especially one who has written somewhat lengthily on the subject, have no recollection of the existence of the disease at that time. In a paper read by Dr. William R. E. Stuart, C. B., before the London Epidemiological Society on the 12th March, 1873, we find, however, the following paragraph: "In 1854 it (Japan) suffered most intensely in most of its cities; the disease (cholera) having been imported, it is said, by the United States frigate *Mississippi*, after which endemo-epidemics showed themselves in Yokohama through a long succession of years at one season of the year." I am quite at a loss to reconcile this assertion with the statements of the native medical men, and am farther disinclined to accept it as true for the two following reasons: First, no mention is made of the existence of the disease, either on board the squadron (the *Mississippi* being one of the vessels comprising it) or ashore, in the report of Commodore Perry's expedition; secondly, no note of the presence of the scourge at this time in Northeastern Asia has been taken by the medical officers of the British navy. I have no means of verifying or contradicting the statement in regard to its yearly endemo-epidemic appearance in Yokohama previous to 1858. I neither saw nor heard anything specific and definite of cholera in 1859, the year of my arrival here, nor in 1860. Of the epidemics of 1861 and 1862 I shall write a few lines farther on. Since the latter year no traces of the disease, either in this place or in other parts of the country, were observed, until the epidemic of last year declared itself. Further, so far from cholera being a domestic epidemic disease in this empire, a singular freedom from bowel troubles of all kinds is noticeable, especially in the northern provinces. I must not, however, omit to mention that, as concerns the year 1858, cholera was then epidemic in China, so that its appearance here at that date could be easily accounted for, especially as the official report states that *some* epidemic of great severity then prevailed, a statement further confirmed from private sources.

As for 1861 and 1862, the disease was then raging, as already stated, in many parts of China. This country was at that time open to foreign trade; and communication was constant, both by steam and sail, with continental Asia. No measures, as indeed is still the case, were taken to prevent the importation of the disease, and the result, as I have every reason to remember, from weeks of day and night work, was a terrible epidemic, attended with great loss of life. An epidemic of measles, brought into the country for the first time in 27 years (it was introduced by a foreigner, no less a personage than the English Chargé d'Affaires), had immediately preceded that of cholera. The consequence was that many persons were attacked by the latter before they had fully recovered from the former malady. For this cause, according to impressions formed at the time, I consider that a much higher mortality rate was reached than is usual from cholera alone. The subject of establishing a quarantine, or taking some means for preventing the importation of contagious diseases into the country by means of ships, was discussed at this period; and I then met, at the United States legation in Tokio, by request of the Japanese Government, a delegation of medical men appointed by the Yeeoon for the purpose of drafting some regulations on the subject. As, however, the epidemic had by that time nearly exhausted itself, and the moment of immediate necessity for enforcement of stringent preventive measures had passed away, nothing came of this conclave's deliberations.

From 1862 until 1877, or during a period of fifteen years, no case of cholera is known to have occurred here, notwithstanding that the disease did not entirely cease its ravages in China until 1867—five years later than its temporary disappearance from Japan.

I subjoin extracts from a translation, which recently appeared in the *Hiogo News*, of a native "brief history of cholera" in this empire.

"In the summer of the 6th year of Shōtoku (2376, era of Jimmu) (A. D. 1718), in the reign of Nakamikado Tennō, and during the rule of the Shōgun Yoshimune, fever prevailed, and the mortality in the city of Great Yedo exceeded 80,000 per month. Owing to the rapid spread of the disease and the number of deaths, the carpenters were unable to keep pace with the demand for coffins, and empty *saké* casks had therefore to be employed for the purpose. The graveyards were at length all filled up, no space remained for more burials, and the priests of the various sects refused to permit the interment of the remains, insisting that the bodies should be burned, and only the ashes be buried.

"At the various cremation grounds, therefore, coffins in countless numbers were seen piled on top of each other, the burning of bodies being done in regular succession, according to the order of their arrival. Numbers of corpses, mostly of poor persons, had to be left unburnt for upwards of half a month, and the head-man of the ward was at his wit's end what to do in the matter. The government was therefore asked for instructions, and an order was issued that the bodies should be wrapped in coarse mats, and that (after the performance over them of a brief religious ceremony) they should be conveyed in boats to the Bay of Yedo, and sunk in the sea.

"This we read in the Shokio Kanki, and we may judge from the virulence of the disease that it was quite different from ordinary fever. We are inclined to think that it was what we now call cholera, and that this was the first appearance of the pest in our Toyoashihara ["fertile sweet flag plain"—Japan]. We, however, invite an expression of opinion from antiquarians.

"Again, in the fifth year of Ansei (2518, era of Jimmu), during the reign of Komio Tennō, and at the time when Iyeshige was Shōgun [A. D. 1850], an epidemic prevailed in Yedo, as many persons will recollect. This disease first manifested itself in the neighborhood of Akasaka, in the beginning of the seventh month of that year; according to some, it was brought from the Tokai-do. Reiganjima became infected and soon it spread in all directions. During the first half of the eighth month the epidemic raged most furiously. At the gates of every temple there were hills of coffins; the men who worked at the cremation furnaces in the evening were themselves changed into smoke the next morning, and the tombstone-cutter of one day found his own name carved on a stone on the morrow. The panic amongst the populace beggared description. The epidemic was regarded with even far greater dread, by both high and low, than is the prevailing one in this twelfth year of Meiji, for medical knowledge was in such a crude state that no one was able to ascertain the cause of the disease, and the people could do nothing but sit down in dread suspense and await the approach of death.

"The disease was generally attributed to diabolical agency; hence the people gave it the name of *ko-ro-ri*, that is, "fox, wolf, and badger." It was also believed that all water and all fish were poisoned, so that people dared not draw water even from the pure stream of the upper Tamagawa, nor eat any fresh fish, even when it was brought to their doors alive. Each one adorned his gate with branches of pine and bamboo, and straw ropes, and prayed that so dreadful a year might pass away as quickly as possible; some praying to the *kami*, and some to Buddha. The whole city was filled with horror and dismay, and a state of things existed to which that in Osaka at the present time bears but a faint resemblance.

"If we may believe the *Ri-riu koki*, or Record of the Ravages of Dysentery, which was published in the ninth month of the fifth year of Ansei, there were then in Yedo 1,775,215 houses and a population of 7,101,318. The disease was most virulent between the 1st and 30th of the eighth month, during which space of time the number of deaths was 12,492, as appears from the statistics of death reported to the Government daily. Besides these, 18,737 persons, whose names had not been properly registered at the ward offices, died. For the first three or four days in the beginning of the ninth month there were 50 or 60 deaths daily; after that the number gradually decreased, and at length the disease entirely disappeared, and tranquillity was once more restored." * * *

Sanitary measures and other necessary precautions are now undertaken by the Government, and the people have nothing to do but obey its orders and take care of their health. Even in the period of Ansei certain precautions were observed, so that those who ignore the sanitary regulations made by the present Government of Meiji are not only offenders against it but also against the late Bakufu.

We give below a copy of a notification issued by the Bakufu in the fifth year of Ansei (A. D. 1850), that our readers may learn what measures were taken to combat the disease at that time:

"For the prevailing disease of sudden purging there are various methods of treatment, amongst which the undermentioned is notified for the benefit of the people. In the way of precaution, avoid exposing your body to cold air, always wear a cotton belt around your abdomen, be careful to avoid gluttony and excessive drinking, and the eating of indigestible food. If symptoms of the disease appear, go to bed, be extremely careful of what you eat and drink, keep the whole body warm, and take the medicine called *hoko-san*, as prescribed below; many valuable lives have been saved by it alone. If you vomit and purge much, and your body becomes cold, put 2 *monme* of refined camphor into 2 *go* of spirit (*sho-chiu*), warm the mixture over the fire, dip a cotton cloth in it, and rub the body and limbs briskly. Then put a mustard-plaster over the stomach every half hour. To make *hoko-san*, mix together powdered cinnamon, *yekioht*, and dried ginger, in equal quantities, and boil; drink at intervals one or two cupfuls at a time. To prepare the mustard plaster: mix together powdered mustard seeds and wheaten flour, pour in vinegar, and mix well. Spread the mass over a cotton cloth, and apply to the stomach. In urgent cases, when time is precious, use mustard only, mixing it with hot water. Another medicine: into a certain measure of hot tea pour about one-third the quantity of spirit, add a little sugar and drink. The patient must shut himself up in a close room, and rub his body with a cotton cloth that has been soaked in spirit. If his extremities are cold, warm them with hot stones until he perspires.

"The above is a course of treatment which may be applied with benefit in the case of any one attacked by the prevailing disease. This is notified to all.

"Eighth month of the year of the Horse."

HISTORY OF THE ARRIVAL OF THE EPIDEMIC OF 1877.

In order to ascertain the source of the visitation and the probable means by which the scourge was imported into Japan in 1877, it will be necessary to refer briefly to what is known of its existence and progress in China immediately beforehand. This I am enabled to do by means of the Medical Reports of the Chinese imperial maritime customs, No. 14, April to September, 1877. The work is specially important because of the questions raised in this neighborhood, at the time the intelligence first reached us of the prevalence of the disease in China, as to whether the complaint was really Asiatic or epidemic cholera. It is also valuable because it once more points to the necessity at all times of the immediate institution of some measures, on the receipt of reliable information, for the inspection of ships coming from infected ports, and their detention when requisite in quarantine, regardless of the objections of a few ship-owners or agents, and of those otherwise engaged in commercial transactions. Neglect to take precautions in the autumn of 1877 cost this country many valuable lives then; and has beyond doubt been the first cause, through direct succession, of the far more serious disasters of 1879.

The first cases of the disease on the coast of China appear to have manifested themselves in Amoy, as will be seen by the following extracts from the report communicated by Dr. David Manson, customs surgeon at that port:

"The first intimation of cholera was a request by the Spanish consul-general to examine the body of a Manilaman who had died suddenly, with a history of vomiting, purging, cramps and collapse, on the 20th June. His sudden death was the cause of the request for a *post mortem* examination. *On inquiry among the Chinese I learned that since the first week in June many deaths had occurred from a similar affection.* On Monday, 25th June, I saw in a dirty boarding-house a Japanese sailor collapsed from cholera. * * * During these few days at the latter end of June and throughout July, Chinamen were frequently to be seen in the streets of the foreign concession in different stages of the disease. * * * The first week in July the Chinese reported the mortality at from 10 to 100 daily. * * * The disease was no longer confined to one part of the town; it had spread over the whole native city. * * * On 2d July one of the marines on board H. M. S. Hornet was attacked * * * and died at 3 p. m. On 3d July a sailor from the Hornet was admitted to hospital in a state of collapse; he recovered. * * * Among the Chinese the disease is reported to have spread to the large cities in the neighborhood of Amoy, and the mortality was very great. * * * The probable mortality at the height of the epidemic was 75 per diem, possibly 100. The total mortality among the Chinese was about 1,600 in a population of 80,000. * * * At the height of the epidemic it was not possible to move about much out of doors without encountering several cases, either on the roadside, in the streets, or in sampans."

Dr. Jamieson's report for Shanghai contains the following:

"The first case occurred in June and was fatal. The alarm was given on the 2nd July by telegram to the commissioner of customs, reporting the presence of cholera in a very fatal form at Amoy. * * * In August there were two deaths (among foreigners). * * * Early in September cholera reached Nagasaki and spread thence to Kobe and Yokohama. * * * In the visitation of this year (1877) there were, as far as I can ascertain, 22 cases (among foreigners), of which 16 died. * * * It is certain that cholera was prevalent and fatal in the city and native quarters of the settlements during August and September."

Dr. J. R. Somerville, customs surgeon at Pagoda Anchorage, Foochow, reports as follows:

"The total mortality (by cholera) in and about Foochow is estimated by the Chinese at from 5,000 to 7,000. The disease still continues (November 9th)."

Early in the summer I was informed by a medical man, who had been a long time in practice in Saigon, that cholera was epidemic there when he had left but a few days before. The U. S. S. Saco, while on a cruise among the Philippines in 1875, had cholera on board. Dr. Ayres, of the U. S. S. Ashuelot, also informed me that he found cholera prevalent and fatal in most of the Chinese ports during the whole of the summer of 1877.

The first intimation received by the Japanese Government of the existence of cholera in China was by a telegram from their consul in Amoy, bearing date the 7th of July. The dispatch stated that the disease had appeared in that place some days before, or about the 27th of June. In the mean time the English minister in Tokio telegraphed an inquiry to the Hong Kong authorities as to what action had been taken by the government of that colony in the matter. A reply was received to the effect that the colonial authorities did not consider the disease in Amoy sufficiently severe to justify the declaration of quarantine. This fact was communicated to the Japan-

ese ministry, whereupon the enforcement of the rules of a convention agreed to four years previously was indefinitely postponed; and ships from the infected ports were allowed to enter the treaty ports of Japan without even submitting to a preliminary examination.*

It was, however, and notwithstanding the assurance given, deemed prudent by the Japanese Government, in view of the great severity of former epidemics, to take all available precautions to stay the progress of the disease in the event of its entering the country. Temporary cholera hospitals were built at the open ports with all possible dispatch, and general information respecting prophylactics and the proper modes of treatment was diffused among the people by means of the newspapers and printed pamphlets.

Under circumstances the most favorable for observation it is often very difficult to fix upon the exact vehicle by means of which cholera gains an entrance into a country. So we find it in regard to the epidemic of 1877. Even the government, after several months devoted to the investigation of the subject, succeeded in arriving at no more than an approximation to the facts. Grave difficulties, in addition to the absence of quarantine regulations and universal inspection of ships coming from infected ports, were occasioned by the Satsuma rebellion, then at its height. In the history of cholera everywhere, war has been one of the most potent instruments for the transportation of the disease. The necessities of campaigning defy all ordinary rules, sanitary or other. But though the insurrection was no doubt responsible for the spread of cholera in and about the neighborhood of the scene of strife, it can in no way be accused of originating the epidemic, which, as the facts enumerated in the Chinese customs reports already quoted tend to establish, must have come first from China to Nagasaki, whence it afterwards spread to two other open ports, Hio-go and Yokohama.

In reply to an inquiry by letter addressed to Dr. C. L. Fischer, United States consul at Nagasaki, as to the origin of cholera in that place, I received the following reply:

"Some time in August it (the disease) first made its appearance in a little village inhabited by washmen that attended the shipping. The next day it made its appearance in another village half a mile distant, also inhabited by washmen. On the same day it also appeared on board an English man-of-war then lying in this harbor. Three days later it appeared on board of our United States naval vessel. The latter had two cases, one proving fatal. The English man-of-war had four cases, two proving fatal. There were other cases reported among the merchant shipping, some I believe fatal. None of the foreign residents were attacked. As to where it first came from is a question not yet settled, but the close appearance of the same on shore and on the English man-of-war gives a shadow pointing to its importation by that vessel."

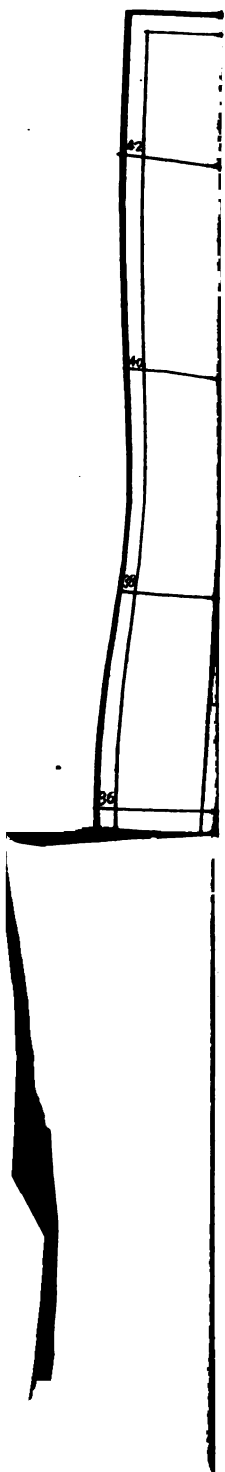
I have also been informed by the captains of three of the steamers in the government transport service, who were in Nagasaki at this time, that they believed the disease was brought to that place from Amoy by an English man-of-war. On the other hand, I am confidently informed by Dr. Lambert, lately resident staff surgeon in H. B. M.'s naval hospital at Yokohama, that the only case of cholera on an English man-of-war in Nagasaki, during the season in question, occurred on H. B. M. S. Juno, on the 8th of September, in a man who had broken his leave, and consequently brought the disease from the shore to the ship.

The following abridged extract is from the log of the late Captain Vroom, then of the *Shinagawa Maru*, of the Mitsu Bishi Mail Steamship Company, at that epoch employed in the government transport service, showing the early appearance of the disease on board his steamer:

"September 4.—A few hours after leaving Nagasaki for Kagoshima, with several hundred of the war police, my engineer died of cholera. Within four days 90 of the force succumbed to the disease; and, subsequently, 110 more."

There can be no reasonable question that the engineer and the 90 others who immediately followed him contracted the disease in the town of Nagasaki. I am therefore strongly disposed to accept the statement of Dr. Fischer as to the existence of the epidemic in that place in August as correct, thus necessitating the dating back of all other reports as to the first appearance of the disease. Further, I find the theory of direct importation from China, or other than by way of Nagasaki, to Yoko-

* When it was thus announced that no quarantine had been established in Hong-Kong, it was not thought necessary to add that a health officer is there employed, supposed to inspect all vessels entering the harbor, and to isolate those having cases of infectious disease on board. Nor was it stated that these precautionary measures mean, in case of danger, the enforcement of the sanitary regulations of the colony, and are calculated to be in all respects equivalent to a quarantine, though they may not pass by that name.



hama unnecessary; and I hold to the opinion that cholera was brought hither by one of the steamers, then almost daily leaving the southwest for this and other northern ports.

APPEARANCE AND PROGRESS OF CHOLERA AMONG NATIVES IN YOKOHAMA IN 1877.

Although I may confidently say that I expected the disease to arrive in Yokohama before the season should be over, this expectation was not supported by the usual forerunner of great cholera epidemics, namely, the general prevalence of bowel complaints, which in this instance were only noticeable to the usual extent observed at the same period of the year, and are always readily accounted for by the general use of unripe or unwholesome fruits. My anticipation was, however, unfortunately verified. The first case of cholera was that of the wife of a builder's cooly, and occurred on the 5th September in the suburb or adjoining village of Kanagawa. The woman presented all the symptoms—vomiting, purging, cramps, and collapse—characteristic of the true disease, and died in about twenty-four hours from the time of seizure. On the 7th, two days later, the remaining members of the family, consisting of the husband, grandfather, and son, were attacked. The husband and grandfather died the next day, with all symptoms of cholera; and four days later, on the 11th, the son also expired. No more cases occurred, as far as could be ascertained, in the immediate vicinity of this family, which furnished the first four victims. The fifth case occurred on the 9th, and was that of the wife of the assistant judge of Yokohama, whose house was situated on Ise Yama, between two and three miles distant from the tenement in which the first case appeared, and on the opposite side of the bay. No communication appears to have taken place between these two centers of disease. This lady died within twenty-four hours, presenting all the true symptoms. The sixth case was that of the sister of the last-mentioned sufferer. She had been acting as nurse to the patient, and died on the 12th, a few hours after being attacked. Case 7 was that of a cooly master living near the iron bridge, who was taken in the morning, and died seven hours later. The distance between this locality and that furnishing the previous two cases is about three-quarters of a mile, and 3 miles from that of the first 4. Between none of them could any connection be satisfactorily traced. Case 8 was a woman living in Tobe, in still another quarter of the town. She died on the 14th, after a few hours' illness; but her son (case 9), who was attacked on the day of her death, recovered. Case 10 was that of a neighbor of case 8, a woman who had visited her during her illness. She died on the 15th, with all the symptoms of cholera. Case 11 was a woman in a street leading to the Yoshiwara; occupation, vender of old clothes; died on the 15th.

From this time the cases increased rapidly in number in various sections of the town. It is a curious circumstance that, with one exception, the persons first taken in the different localities were women. I can only suggest the following explanation for this. Near the place where the first case, that of a man, occurred is a small temple much frequented by women, on leaving which it is their custom not only to dip their fingers in water, contained in a stone basin, as part of their form of devotion, but often to wash their mouths with it, or even to swallow a small portion. The mystery would be solved by supposing the water of the basin to have been contaminated with cholera germs. The well which furnished the liquid for the basin may have been the same as that used by the man who died of the disease in the neighborhood. The first cases observed were nearly all fatal, only one of the 11 above mentioned having recovered.

My official report of the real nature of the disease was dated the 15th September, although I had been watching its progress for ten days previously. On the following morning a large number of the native physicians were assembled at the Nogé local Government hospital, where I gave some general instructions as to the management of cases that might fall into their hands, with a simple prescription for use during the premonitory diarrhoea. An order was then issued for making up medicine, and its free distribution to all who might require it. On my report being forwarded to the department of the interior, an appropriation of 5,000 *yen* (dollars) was immediately granted to the Kanagawa Kencho* for the local health board, with an order to make use of it in preventing as much as possible the spread of the disease. The most vigorous measures were instantly inaugurated to that end. Within four days, or on the 19th September, the temporary hospital already prepared at Ota, in the suburbs, commenced to receive such cases as could not be properly cared for in their own homes. A special police force was detailed, and physicians with necessary medicines were placed in attendance at the several police stations, where it was ordered that all new cases of cholera should be reported. Notices were posted on the main entrance of the residences of affected persons, announcing the existence of the disease on the premises. Carbolic and sulphuric acids were the disinfectants used. So determined

* Office of the prefecture.

were the authorities in their endeavors to eradicate the disease, that in a large majority of cases the matting, bedding, and clothing of those attacked were destroyed by fire, and, in the case of the extremely poor, replaced by new, at the expense of the Government. When death occurred the corpse was cremated. Public water-closets and drains were thoroughly disinfected, and an examination of the wells instituted. Those found to contain impure water were immediately closed. A brief monograph containing information regarding the disease, its prophylaxis and proper treatment, was prepared by me, and placed by the authorities of the prefecture within reach of all. In this the use of boiled water only for drinking was urgently recommended. The preventive means taken in Tokio and other large cities were also vigorous, the general plan adopted by the Yokohama board being followed elsewhere. In the foreign concession of this port a health board was also organized, and consisted of all the foreign medical men (but one, who refused to act) and a number of laymen.

This being the first attempt made by the Japanese Government to combat the scourge by scientific measures, the liberality, promptness, and disregard of the usual official retarding formalities, displayed in the appropriations, deserve the greatest praise.

HISTORY OF THE EPIDEMIC OF 1877 AMONG FOREIGNERS IN YOKOHAMA.

From the proximity of the native town to the foreign settlement, and the constant intercourse between the two, foreigners, as might have been expected, did not entirely escape. Their better hygienic condition, however, and the intelligent precautions used against the known predisposing and exciting causes were effective in confining the malady among them to a few cases. In the concessions the great danger of contracting the disease existed in the communication of servants with the native town, or through waiters or day servants, by means of whom it might be, and is known to have been, brought upon certain premises, even without the knowledge of the masters, there to germinate, and form a focus of infection not only for all members of the establishment but for the inhabitants of the neighborhood. The probable cause of the disease among foreign seamen afloat in the harbor was their imprudent visits to the native town, and their consumption of water and stale fruits there, thus subjecting themselves to the same sources of infection as were fatal to the natives.

The first case was that of a ship captain named Jordan, who was living in a quarter of the native town severely affected by the disease. He died on the 25th September, on the second day after being attacked. The second case manifested itself in the main street of Yokohama, and was fatal on the 29th September; and the third occurred in the same abode, and ended fatally on the 1st October. The infection was brought to this house by a Japanese tailor who spent his nights in the native quarter. The fourth deadly case was that of Dr. Massais, a French practitioner, who died on the 9th of the same month. Between this and the 25th three fatal cases occurred among seamen from the harbor and two other sailors died a few days after going to sea.

Total number of resident foreigners attacked, 12; died, 4; recovered, 8.

Total number of cases from the shipping: Attacked, 6; died, 5; recovered, 1.

Total number of cases, 18; died, 9.

The efforts of the health board undoubtedly had much to do with the comparatively small number of cases in the settlement. The board instituted a careful inspection of the entire quarter, caused the abatement or removal of nuisances, and insisted upon a rigid looking after the water supply of private residences. A great deal of temporary anxiety was caused by the presence, in the very heart of the settlement, of a Chinese quarter. On the day that the outbreak was declared I selected, at the request of the consuls, a committee of medical men to make inspection and report upon the condition of this region. It was found to be in a most wretchedly filthy condition, and immediate steps were taken to secure its being cleaned by the inhabitants. A liberal supply of sulphurous acid was poured daily into the drains and closets, a practice which was kept up during the whole prevalence of this epidemic. The water of the wells was so bad that no attempt was made by the residents to use any of it for drinking purposes; a much safer condition than if it had been less unpalatable. The drinking supply was, without exception, obtained from a running hydrant, fed by pipes from a neighboring hill, and discharging in the middle of the quarter, and from two or three excellent wells outside. For this and perhaps other reasons, which I will consider later on, the very section of the town where the disease was expected to appear in its worst form escaped even better than the well-drained European settlement. Only one clearly authenticated case of cholera was reported from China Town.

GENERAL CHARACTER OF THE EPIDEMIC OF 1877.

The visitation, all things considered, was a mild one. The "epidemic constitution" appears to have been in some respects wanting, as was indicated by the absence, already referred to, of prevalent diarrhoea. As the scourge spread, however, this

form of sickness manifested itself more frequently, but not to the extent usually noticed during severe cholera epidemics. Cases of sudden collapse were comparatively few, and the more rapidly fatal cases were observed during the first part of the epidemic. Dysenteric symptoms appeared at the end of the first month and typhoid symptoms towards the last. By a glance at the subjoined table kindly sent me by the National Health Board, the progress of the disease, death-rate, &c., among the natives throughout the empire, will be readily seen, thus rendering it unnecessary to review this part of the subject here.

Some very interesting instances have been reported by my assistants, who had been sent out into the rural districts of this province to watch the advance of the pestilence, instruct the native physicians in its treatment, and circulate the monograph which I had prepared on the subject. One of these cases being of more than usual importance I will specially record it:

"A farmer brought a load of grain to market, and, having disposed of it, remained overnight at the house of a merchant where a case of cholera had occurred a few days previously. On the second day after his return home, a distance of 15 or 20 miles, he was taken with violent vomiting and diarrhoea. His stools were thrown into a sluggish stream passing near his habitation and also flowing close by a number of houses some yards distant. Here cholera broke out a few days after the sufferer's return, no cases having appeared in that locality previously. Upon investigation it was found that the stream, during the periods of heavy rain, overflowed its banks, thus permitting its water to penetrate into the wells about; and, as no cases occurred above the first patient's residence, it is quite clear that the poison was disseminated in the manner indicated."

In Tokio its first manifestation was in the neighborhood of the landing used by the crews of fishing boats from Yokohama, and the disease was most severe in the vicinity of the fish market; thence, again, the fish venders carried it to different parts of the city. It is remarkable, however, that the total number of cases in the capital was very small when compared with those which occurred in Yokohama.

Observations as to the influence of rain on the progress of the epidemic showed that when showers were falling slowly no marked change was noticeable in the disease rate; but when the fall was heavy for a few successive hours a rapid rise invariably followed on the fourth or fifth day afterwards. This I account for by the fact that the drains of the native town are surface ones, and that the excess of water caused them to overflow and contaminate the wells.

TABLE No. 1.—*Cholera returns, 1877.*

Fu or ken.	Population.	Returns commenced.	Patients.	Dead.	Cured.	Under treatment or result unknown.	Percentage of mortality.	Patients in 10,000 of population.
Tokio.....	881,421	Sept. 15	647	509	115	23	.....	.....
Kioto.....	798,897	Sept. 15	70	53	17	.....	.....	.....
Osaka.....	553,777	Sept. 22	1,619	1,228	389	2	.....	.....
Kanagawa.....	715,258	Sept. 6	1,146	663	480	3	.....	.....
Hogo.....	1,387,377	Sept. 22	466	349	117	.....	.....	.....
Nagasaki.....	1,173,263	Sept. 2	1,446	653	470	312	.....	.....
Nilgata.....	1,504,613	Sept. 27	3	2	1	.....	.....	.....
Saitama.....	912,528	Sept. 21	29	6	13	.....	.....	.....
Gumma.....	554,888	Oct. 3	3	1	2	.....	.....	.....
Chiba.....	1,078,635	Sept. 12	455	293	156	6	.....	.....
Ibaraki.....	875,491	Sept. 23	26	25	1	.....	.....	.....
Tochigi.....	543,245	Oct. 3	1	.....	1	.....	.....	.....
Sakai.....	923,030	Sept. 20	209	154	55	.....	.....	.....
Miye.....	830,413	Sept. 19	53	34	19	.....	.....	.....
Aichi.....	1,267,206	Oct. 1	2	2	.....	.....	.....	.....
Shizuoka.....	976,405	Sept. 3	40	29	11	.....	.....	.....
Yamanashi.....	381,229	Sept. 18	11	7	4	.....	.....	.....
Shiga.....	721,099	Oct. 7	23	19	9	.....	.....	.....
Gifu.....	818,964	Oct. 7	3	3	.....	.....	.....	.....
Nagano.....	973,959	Oct. 23	.....	.....	.....	.....	.....	.....
Fukushima.....	765,115	Sept. 16	.....	.....	.....	.....	.....	.....
Awamori.....	462,865	Oct. 20	9	6	3	.....	.....	.....
Akita.....	613,389	Oct. 19	2	2	.....	.....	.....	.....
Ishikawa.....	1,825,507	Sept. 26	16	10	5	1	.....	.....
Shimane.....	1,023,678	Oct. 9	5	3	1	1	.....	.....
Okayama.....	724,621	Sept. 27	135	103	25	7	.....	.....
Hiroshima.....	1,197,385	Oct. 3	72	41	24	7	.....	.....
Yamaguchi.....	855,618	Oct. 1	85	60	17	8	.....	.....
Wakayama.....	591,668	Sept. 27	80	62	18	.....	.....	.....
Yehime.....	1,403,693	Oct. 3	111	55	41	3	.....	.....

TABLE No. 1.—Cholera returns, 1877—Continued.

Fu or ken.	Popula- tion.	Returns com- menced.	Patients.	Dead.	Cured.	Under treatment or result un- known.	Percentage of mortality.	Patients in 10,000 of population.
Kochi	1, 164, 723	Sept. 29	59	88	21	.....	.....	.....
Fukuoka	1, 070, 244	Sept. 10	430	312	118	.....	.....	.....
Oita	718, 816	Sept. 30	147	79	68	.....	.....	.....
Kumamoto	980, 976	Sept. 20	1, 681	979	702	.....	.....	.....
Kagoshima	1, 208, 162	Aug. 12	1, 022	553	460	9	.....	.....
Kaifu	150, 667	Sept. 25	102	84	18	.....	.....	.....
Army statistics:								
Nagoya garrison		Oct. 10	30	5	25	.....	.....	.....
Osaka garrison hospital		Oct. 1	48	15	33	.....	.....	.....
Hiroshima garrison		Oct. 1	7	7	.....	.....	.....	.....
Kumamoto garrison		Sept. 29	68	26	42	.....	.....	.....
Marugame garrison		Oct. 1	34	18	16	.....	.....	.....
Osaka temporary hospital		Oct. 1	152	89	63	.....	.....	.....
Nagasaki temporary hos- pital		Sept. 23	113	68	45	.....	.....	.....
Kagoshima temporary hospital		Sept. 14	577	300	277	.....	.....	.....
Tokio, Kohinata tempo- rary hospital		Oct. 19	92	40	52	.....	.....	.....
Kanagawa infecting hos- pital		Oct. 18	75	51	24	.....	.....	.....
Kobe army infecting hos- pital		Sept. 26	414	255	159	.....	.....	.....
Kioto		Oct. 1	326	154	172	.....	.....	.....
Shiga		Oct. 1	126	18	108	.....	.....	.....
Navy statistics:								
Tokio		Sept. 7	1	1	.....	.....	.....	.....
Shinagawa		Sept. 7	14	4	10	.....	.....	.....
Yokohama		Sept. 7	1	1	.....	.....	.....	.....
Yokosuka		Sept. 7	16	5	11	.....	.....	.....
Uraga		Sept. 7	6	3	3	.....	.....	.....
On ships			6	6	.....	.....	.....	.....
Mitsui Bishi:								
On board Mitsui Bishi steamers		Sept. 15	59	25	26	8	.....	.....
Total	32, 660, 297	.....	12, 378	6, 508	4, 447	390	52. 58	.....

THE EPIDEMIC OF 1878.

Although the epidemic of 1877 was, comparatively speaking, light, yet its appearance in the following year was anticipated as almost certain by many well qualified to make a forecast. Unfortunately, their opinion was but too well founded. Early in the spring of 1878 a number of cases, as a reference to the subjoined table will show, occurred in Osaka.

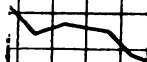
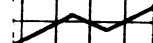
In Yokohama only two confirmed cases of the malady appeared during the summer and these were reported as sporadic cholera or cholera morbus. On the 11th of November, however, a case occurred in a portion of the town where the disease prevailed most severely in the previous year; and this was followed by many others in quick succession in the same neighborhood, one family of three persons falling victims to its ravages. The earlier of these cases were typical of the disease, no single symptom being absent, and all proving fatal. With few exceptions, the scores remained in the district in which it had revived. The last instance occurred on 23d January, 1879. Total: Cases, 33; deaths, 25.

In the harbor a French man-of-war had three cases and a Japanese vessel one. On all four foreigners, two of whom died, were attacked at short intervals. All the patients here indicated suffered from cholera and not from some milder or other complaint.

The usual disbelief which is apparently without exception expressed whenever Asiatic cholera makes its appearance in or near communities of western peoples, home or abroad, was again manifested. How inexplicable is the skepticism which obtains as regards cholera, but no other disease. No matter how high the authorities which vouches for its first appearance, the truth is disputed by laymen and medical men alike. There is no parallel for this unbelief in the cases of other visitations. No one would dream of gainsaying a medical certificate of small-pox or typhoid fever or the existence of those complaints in an isolated or an epidemic form, when vouched for by trustworthy persons, competent to judge. Not so, however, with regard

georolo

47	" 22
48	" 23
49	" 24
50	" 25



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cholera. No sooner does a doctor mention the fact of having a case in his charge, than even non-professional men begin to interrogate him as to the symptoms; and his statement is generally more or less discredited. For instance, the official reports show that a by no means inconsiderable number of cases of cholera occurred in 1878 in Nagasaki. Yet some of the resident consuls and surgeons of the men-of-war then lying in that port deny that the disease was present. I can only account for this anomaly by supposing that there are constitutional skeptics, men who distrust not only external testimony, but the evidence of their own senses: "Neither will they be persuaded though one rose from the dead." There is yet another class of people who imagine that it is always to their interest to maintain that no epidemic can be present. Such, perhaps, are some merchants, ship-owners, and the official of commercial powers, all of whom persuade themselves that they have reason to dread the obstruction to trade were the truth to go abroad and be received by every one without contradiction. For those in Japan who held such views, and supported them by pointing to the comparatively small ravages effected by cholera in 1877 and the still more trifling effects of the continuance of the same epidemic in 1878, the calamity of 1879 was needed to put them to silence by setting all their assertions and arguments at naught.

TABLE No. 2.—*Cholera returns, 1878.*

Fu or ken.	Population.	Returns commenced.	Patients.	Dead.	Cured.	Under treatment or result unknown.	Percentage of mortality.	Patients in 10,000 of population.
Tokio.....	881,421	June 18	8	4	.....	4	50	.....
Kioto.....	798,897	June 9	10	6	3	1	60	.....
Osaka.....	553,777	Jan. 12	26	12	4	10	46.15	.....
Kanagawa.....	715,258	May 23	37	27	4	6	72.97	.....
Hio-go*.....	1,357,377	June 26	.....	.....	.....	.....	.....	.....
Nagasaki.....	1,173,263	Sept. 2	600	339	160	101	56.50	.....
Saitama.....	912,528	Feb. 7	3	3	.....	.....	100	.....
Chiba.....	1,078,635	May 8	1	1	.....	.....	100	.....
Ibaraki.....	875,491	July 20	1	.....	1	.....	.....	.....
Gumma.....	554,888	May 23	.....	.....	.....	.....	.....	.....
Sakai.....	923,030	June 22	5	5	.....	.....	100	.....
Miye.....	830,415	Aug. 3	1	1	.....	1	.....	.....
Shizuoka.....	976,405	July 17	4	2	2	2	50	.....
Yamanashi.....	381,229	June 30	5	3	2	2	60	.....
Shiga.....	721,099	Sept. 26	1	3	1	1	.....	.....
Akita*.....	613,389	Sept. 20	1	.....	1	.....	.....	.....
Shimane*.....	1,023,678	July 22	.....	.....	.....	.....	.....	.....
Hiroshima.....	1,197,835	Aug. 5	1	1	.....	.....	100	.....
Yamaguchi.....	855,618	Aug. 4	4	1	3	.....	25	.....
Wakayama.....	591,668	Jan. 19	42	15	11	14	35.71	.....
Yehime*.....	1,403,693	July 15	.....	1	.....	.....	100	.....
Kochi.....	1,164,723	Jan. 5	1	1	.....	.....	.....	.....
Fukuoka.....	1,070,244	Sept. 13	5	4	1	.....	80	.....
Oita.....	718,816	May 7	3	2	1	.....	66.66	.....
Kumamoto.....	980,976	June 25	214	105	78	31	49.06	.....
Kagoshima*.....	1,208,162	July —	.....	.....	.....	.....	.....	.....
Awamori*.....	462,865	July 4	2	1	.....	1	.....	.....
Total (imperfect owing to absence of full returns from certain districts).....	.....	.....	975	532	273	168	54.56	.....

* Returns incomplete.

THE EPIDEMIC of 1879.

Notwithstanding that the extent of the visitation last considered was not sufficient in any part of the country to entitle it to the name of a disastrous epidemic, yet it lingered persistently in Osaka and other southern portions of the empire, which thus became the *foei* of the very grievous and widespread disease of this year. A glance at the table subjoined to this chapter will show that cholera made its appearance almost simultaneously, some-time previous to the 20th April, in Yehime in Shikoku, Oita, and Kagoshima in Kiushiu, and Hiroshima on the main island of Nippon. It manifested itself in Osaka and Hio-go two or three weeks later, and then followed irregular courses, generally tending northward, until by the beginning of October it had the whole of the empire in its deadly embrace. It will be interesting to trace the direction of the cholera waves by comparing the table with the outline map of Japan. For nearly two months the principal ravages were confined to the circle of

the country indicated by the names of the ken or prefectures above mentioned. In Osaka at one time as many as a hundred and more deaths occurred daily. The unusually long time during which the malady lingered in its first focus before spreading to other and distant parts of the country, together with anomalous symptoms showing slight deviations in a number of cases from the usual type of Asiatic cholera, caused some of the medical men of those parts to refuse for a time to bestow this title upon it. They attempted to show that it was a merely local affection, due to bad diet and neglect of hygienic measures, and called it *gastro-enteritis*. I will not now discuss at length the unsoundness of these peculiar views, as the subsequent widespread prevalence of the disease and the great mortality wrought by it have no doubt caused them to be long ago abandoned. It is to be regretted, however, that they should ever have been advanced,* as they certainly misled the sanitary authorities in this vicinity and elsewhere, and in some cases caused a delay in the institution of precautionary measures against the introduction and circulation of infection, which thus gained a footing in many places where it might have been excluded. For myself I never for an instant doubted the choleraic nature of the disease, nor indeed that it was Asiatic cholera.

Notwithstanding the attempts already referred to to prove the local nature of the disease, the authorities here were by no means convinced of the correctness of the theory; and on the 2d June asked permission of the central Government to institute inspection of vessels arriving from the localities where the disease prevailed. It is evident, however, that the Government was still inclined to believe the statements made as to the local nature of the malady, as the request was not granted until some time afterwards. In the mean time, or on the 18th June, two steamers, the Niigata Maru and the Hiroshima Maru, both from the infected port of Hiogo, arrived; and, as was subsequently proved, brought the first cases of cholera to this place and the capital, under the following circumstances. A stoker from the Niigata Maru, on the evening of his arrival, was seized with cholera in a brothel, whence he was conveyed to the house of a friend in Kanagawa, where he remained for a short time before his case was known to the authorities. He was removed to the temporary hospital at Oita. The quarter of the town of Kanagawa where he stayed became one of the foci of the disease. It is a somewhat curious circumstance that a man then living in Yokohama, where as yet no instance of the complaint had declared itself, and who had passed the remainder of the night of the 18th June with the courtesan visited by the stoker, was seized with cholera at the end of 48 hours. Still more remarkable is the fact that the woman herself escaped infection, as did all the other inmates of the house where she resided.

The next case was a passenger by the Hiroshima Maru, a steamer of the same line, arriving also from Kobe, and on the same day. This man was seized with vomiting and purging before he left the vessel. After landing he went to a hotel in Benten dori, Yokohama. I found him in collapse the next morning, and sent him to the cholera hospital, where he died.

The next case was that of a man occupying a dwelling close to the closet used by the last-mentioned patient. The locality, one of the most favored in the town as regards drainage and the general hygienic condition of the people, formed another radiating point for the disease in Yokohama.

In consequence of the very prompt measures taken in regard to the cases referred to, and the appearance of no new cases for some days, I was strongly inclined to believe it possible that all danger from this source had been overcome. Accordingly, on the 2d July I saw the minister of the interior, communicated to him the facts, and suggested the feasibility of reducing the danger of further importation of the disease to a minimum by substituting, for the simple inspection system which he had authorized, a detention for a number of days. To this he immediately consented, and gave orders accordingly. Two days afterwards, July 4, following said order, I inspected and put the Genkai Maru into quarantine for ten days (which was subsequently reduced to seven days). The reason for the plan adopted was, first, that the Government had accepted the decision of a mixed commission, which it had convened the year before, as to the advantages of the detention over the inspection system, as a means of preventing the importation of the disease from foreign countries; second, that the effect of a detention of a number of days would be an immediate reduction of the amount of travel from the infected localities carried on almost exclusively by sea, and hence a reduction of the chances of further importation of the scourge. Even should this not be entirely successful, the rate of mortality shown in Osaka, a city not one-third the size of Tokio, was enough to suggest the *inestimable value of every additional day that the disease could be kept from reaching the capital with its 800,000 souls*. I at the same time recommend a land quarantine at the two mountain passes, by which nine-tenths of all communication other than by sea was carried on between the southern (or in-

* A British consul was principally responsible for the dissemination of the error. He wrote to his minister to the effect that the disease in Kobe and Osaka was not Asiatic or malignant cholera, at the same time deprecating the quarantine measures proposed to be enforced against those places. He based his report upon information said to have been furnished by a foreign medical man at Kobe.

fects) and the other portions of the empire. *In proof of the justifiableness of the above measures, not a single case of the disease entered by either the sea or land route after they were enforced.* Results so conclusively demonstrative of the efficacy of stringent measures can hardly fail to convince. In view of all the facts, I have no hesitation in affirming that had these measures been adopted before the arrival of the two steamers above mentioned, a very strong probability existed of an entire escape of this section of the empire from the scourge. As it was—as will be seen by the table annexed—the number of cases was very far less in proportion to those in other districts. However, the fact remains that, notwithstanding the energetic measures adopted in regard to the cases above mentioned as having been brought into Yokohama on the 18th, a foothold had been gained; and new cases began slowly to show themselves, radiating from the centers thus established, till the epidemic became general here and in the surrounding country.

It turned out unfortunately also that the passengers by the mail steamers who had furnished the earlier cases in this port had also brought the disease into the capital, and formed a center of infection there, as reported by Dr. Doenitz at a meeting of the Teukiji (Tokio) board of health. After distinctly asserting that "the present epidemic is infectious and Asiatic cholera," he stated that it could be "traced back to and shown clearly to be connected with that of 1877."

"The history of it is this: Some months ago the graves of soldiers who had died of cholera in 1877 were opened by the Government, partly, it is said, for certain religious purposes, partly to bury more decently those who had been hastily interred during the war. The present disease began instantly from that point, spread slowly in Kiushiu, whence it was brought to Yokohama and Tokio by the Hiroshima Maru. Vigorous precautionary proceedings on the part of the Government of these two places, however, kept the contagion within bounds for a time; and it was not till the end of August and early in September, that the number of new cases occurring daily began to attain the average of from 20 to 50 in each of the two localities (Yokohama and Tokio)."

Having once gained a footing in these two places, it followed the usual course of the disease, being most severe in localities in bad hygienic conditions. The foreign town of Yokohama suffered but little, only two fatal cases occurring late in the season. It is a somewhat remarkable fact that the so-called Chinese town, where some 2,000 of this race are crowded in badly constructed dwellings, and abounding in filth, escaped the disease as in 1877, probably for the same reasons, viz, that their drinking water was drawn from a source of undoubted purity.

A central national health board had been permanently established in the capital, and was composed of foreign and native physicians. Its special scope was to provide for quarantine, and to aid its local branches throughout the empire.

Regarding the measures taken by the Yokohama local government, too much praise cannot be bestowed upon it. Much the same method of procedure was adopted as in 1875, based on acknowledged modern principles of sanitation. The permanent sanitary bureau, which was then added to the existing organization of the local government in this place, was now supplemented by an extraordinary board, with the governor or chief of the prefecture as chairman, and the heads of the other departments, police, financial, &c., as members, and a large staff of assistants. The experience of the epidemic of 1877, together with large appropriations from the central Government, as on that occasion (a system adopted in regard to all the local boards throughout the empire to meet the expenses of extraordinary measures), showed even more than previously that the Japanese are almost as capable of conducting operations of this class as any of the western nations. Having been asked to join the organization as before at the very first, no one knows better than I the readiness with which they seize upon everything ascertained and practiced among enlightened nations, which can in any way secure to them the advantages of modern progress in sanitary as in all other matters. I may mention here that a great deal of credit is due to the action of the governors of the various prefectures for their energy in combating the disease. These officers are, almost without exception, young men, selected for their ability or promise, many of them having spent more or less time in foreign countries. To this class belongs Mr. Nomura Yoshushi, prefect of this district, to whose individual endeavor much of the success attending the rigorous sanitary scheme pursued in this vicinity is due. When the disease had fully established itself, he organized and presided over a more complete health board of a temporary character, to which were attached, besides myself, three foreign medical men, Drs. Gutschow, Wheeler, and Geerts. Much valuable service was rendered by this body, especially in the matter of house to house inspection, and instituting measures for the purpose of effectually meeting the altogether possible reappearance of the scourge next year. A large and commodious hospital had already been erected and fitted out under my supervision, to be conducted on modern principles, for the reception of the indigent who could not be treated in their homes. The board further occupied itself in perfecting the arrangements already initiated in this establishment, and in detailing

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committees to visit the localities throughout the prefecture, which is one of large extent, where the disease was most severe, and enforcing measures for arrest or control of the epidemic.

TABLE No. 3.—Cholera returns, 1879 (to 20th December, inclusive).

Fu or ken.	Popula- tion.	Returns com- menced.	Patients.	Dead.	Cured.	Under treat- ment.	Per cent. of mor- tality.	Patients in 10,000 of population.
Yehime	1,403,693	Apr. 22	14,157	9,568	4,588	1	67.59	100.86
Oita	718,816	Apr. 23	5,553	2,973	2,408	177	54.54	77.25
Hiroshima	1,197,835	Apr. 23	6,414	4,443	1,818	153	69.27	53.55
Kagoshima	1,299,162	Apr. 30	1,796	6,748	1,048		41.65	14.72
Yamaguchi	855,618	May 15	6,051	3,277	379	2,395	54.16	70.73
Fukuoka	1,070,244	May 21	4,830	3,087	1,659	84	63.91	45.13
Osaka	553,777	May 22	9,253	7,186	1,913	154	77.66	107.09
Okayama	784,621	May 22	9,096	5,194	3,410	492	57.10	92.38
Kumamoto	980,976	May 24	6,921	3,249	8,278	394	46.94	70.55
Shiga	721,099	May 25	890	601	277	12	67.58	12.34
Hirogo	1,357,377	May 30	9,007	6,208	2,771	28	68.92	66.23
Wakayama	591,668	June 2	2,653	1,829	824		68.94	44.84
Kioto	798,897	June 6	1,411	1,118	239	54	79.23	17.66
Kochi	923,080	June 7	5,849	4,083	1,241	525	69.81	63.37
Sakai	1,164,723	June 7	4,556	2,068	94	2,394	45.29	39.12
Nagasaki	1,173,263	June 11	6,964	2,681	1,684	2,599	38.50	59.36
Miye	830,415	June 15	1,677	1,090	475	112	65.00	20.19
Tokio	881,421	June 19	2,241	1,662	432	147	74.16	25.46
Kanagawa	715,258	June 19	2,253	1,504	749		66.76	31.50
Shimane	1,023,678	June 19	3,482	2,231	1,223	8	64.44	33.82
Ishikawa	1,825,507	June 23	30,916	18,321	7,283	5,812	59.26	169.36
Shizuoka	976,405	June 26	1,489	1,007	358	124	67.63	15.25
Yamanashi	381,229	June 26	1,065	455	591	19	42.72	27.94
Chiba	1,078,635	June 27	1,074	695	379		64.71	9.96
Ibaraki	875,491	June 29	579	305	227	47	52.68	6.61
Gifu	818,984	June 30	457	301	146	10	65.96	5.58
Aichi	1,267,206	July 2	2,056	1,375	549	133	66.88	16.22
Gumma	554,888	July 2	165	105	60		63.64	2.97
Saitama	912,528	July 26	686	363	275	48	52.92	7.52
Niigata	1,504,612	July 8	5,086	2,165	417	2,504	42.67	33.80
Okinaawa	167,822	July 16	8,435	3,656	4,764	15	43.34	501.89
Nagano	973,959	July 27	525	146		379	27.81	5.39
Akita	613,389	Aug. 3	1,015	592	195	228	58.33	16.47
Fukushima	765,115	Aug. 4	1,666	1,104	439	123	66.27	21.50
Tochigi	543,245	Aug. 6	797	436	361		54.71	14.48
Yamagata	657,613	Aug. 8	1,596	780	209	507	48.87	24.08
Kaitaku	150,667	Aug. 8	414	253	108	53	61.11	27.28
Awomori	462,865	Aug. 9	741	349	62	330	47.10	15.94
Iwate	579,249	Oct. 8	39	20	6	13	51.28	0.67
Miyagi	594,684	Oct. 10	78	42	36		53.85	1.31
Army statistics:								
Hiroshima garrison		June 2	9	5	4		55.56	
Osaka garrison		June 17	92	32	60		34.78	
Himeji garrison		June 27	10	4	6		40.00	
Matuyama garrison		June 28	25	7	18		28.00	
Kokura garrison		June 29	29	14	15		48.28	
Otsu garrison		June 29	1		1			
Marugame garrison		July 2	7	2	5		28.57	
Fushimi garrison		July 6	2	1	1		50.00	
Fukuoka garrison		July 11	8	2	6		25.00	
Kumamoto garrison		July 11	83	35	48		42.17	
Kanazawa garrison		July 23	19	16	3		84.28	
Nagoya garrison		July 24	2	1	1		50.00	
Yamaguchi garrison		July 28	9	3	6		33.33	
Second Regiment Imperial Foot Guards								
Shibata garrison		Aug. 13	2	2				
Artillery Guards, Nagasaki Battery		Aug. 10	9	6		3	66.67	
Sakura garrison		Aug. 24	1	1				
Military officers' school		Aug. 23	1	1				
Narawashino-hara		Aug. 31	3		3			
Navy statistics:								
Yokohama		Oct. 17	1		1			
Yokosuka		July 30	32	12	8	12	37.50	
Uraga		Aug. 8	5	3		2	60.00	
Shinagawa		Aug. 21	5	3	2		60.00	
Pest hospital at Nagaura		Aug. 22	5	2	3		40.00	
Total			164,274	97,422	47,162	19,590	59.30	47.40

GENERAL CONSIDERATIONS ON THE CHARACTER OF THE EPIDEMIC OF 1879; TREATMENT, &c.

Though the period of epidemic prevalence of cholera in Japan before the treaty ports were opened to foreigners is obscure, as already stated, my own residence in the country for the greater part of the time since that event enables me to speak with certainty in regard to all subsequent ones. Between the epidemics of 1861-'62 and that of the last three years, no disease has appeared here resembling that widespread and fatal one. In this opinion I am supported by Dr. Hepburn, who has been a resident for the same length of time as myself. Thus, I venture to assume as settled the question of the non-endemic nature of the disease, in opposition to the assertions to the contrary of those whose length of residence and opportunities for observation have been incomparably more limited than ours. The visitation of 1861-'62 found this country in much the position of all others of the Orient as regards a knowledge of means for staying, in any way, epidemic ravages. The result was an immense destruction of life, of which only the vaguest account exists. This may be seen from the fact that the basis of the mortality rate in Tokio, the capital, was formed thus: A bridge on the principal thoroughfare was swept after each lot of one hundred corpses had passed over it. I refer to this here to illustrate the immense progress which this country has made in these matters, as may be seen more markedly by the carefully prepared tables of the epidemics of 1877-'78-'79 printed with this paper. I am aware that the correctness of these may be questioned, in view of the limited experience of this people in such business. From my own knowledge of the painstaking manner in which these statistics are prepared, in connection with the extraordinary attention given by the officials to detailed records of the minutest particulars in other matters, I am, however, disposed to consider them as correct as most others compiled under more favorable circumstances. The question of diagnosis by but imperfectly educated, or, more properly speaking, entirely uneducated men in many cases, is raised as another objection to this view. I answer that cholera presents, as a rule, such unmistakable symptoms that few among the more ignorant are unable to recognize it. In any case, errors of diagnosis find a fair offset in concealment—to avoid the observation of the sanitary police—even when temperate repressive measures are resorted to. Though gained at a fearful cost, the experience acquired by the whole country in sanitary science during these three years of epidemic prevalence of cholera has been immense; such an impulse has also been given by the calamity to medical education as could hardly have been attained in any other way. The doctors of the Chinese school, who form eight-tenths of all the medical practitioners of the country, have been brought into contact with men sent from the various sanitary boards to their assistance, and who were well up in modern hygienic knowledge. The repressive measures initiated here, and always unavoidable when effective sanitation is attempted, were not unfrequently opposed by the ignorant masses. In most cases, however, they were peacefully overcome. This was due in a great degree to the liberality of the various local organizations in making reasonable compensation for losses sustained by those on whom the effect of the legislation unfortunately fell. The hospitals—those constructed in this section at least—were roomy, and the attendance was liberal and good. In some cases one of the family of the patients was permitted to accompany them to, and aid in their care at, the lazarets. At the one where I was in attendance no single instance of infection, traceable to this humane provision, occurred. The medicines, ice, and nourishment supplied were abundant and good. Cremation of those who had died from the disease was almost universal, a practice rendered comparatively easy from the fact that the people, in many cases of their own accord, adopt this method of disposing of their dead. The principal disinfectant used was carbolic acid. As this article is only obtained from Europe and America, advantage was taken by speculators, both native and foreign, of the great demand for it, so that the price per pound ranged from \$1 to as high as \$10. Notwithstanding this, there was little stint in its use in the large towns. In the rural districts, however, it was impossible to meet the demand. During the first year of the last epidemic prevalence of the disease (1877) I advised the use of a solution of sulphurous acid, so strongly recommended by Lebert (Ziemssen's Encyclopædia, American translation, vol. 1, p. 452) for the disinfection of vaults, privies, night-stools, and vessels, which plan was adopted in this place, and to a certain extent in Tokio, with apparent good results. Lebert closes his remarks on this disinfectant as follows:

"My experiments with it justify the hope that we may possess in it a potent, cheap, and easily applicable method of disinfection for a wide range of cases."

This is a most important consideration, in view of the fact above stated in regard to carbolic acid, which cannot be made here in any considerable quantity, in consequence of the very few gas-works in operation, while sulphurous acid can be manufactured both cheaply and abundantly. I am disposed, however, to think that to much importance is often attached to the value of disinfectants generally, for the reason that they are rarely used in sufficient quantities, especially where price is taken into ac-

count. The same amount of money expended in furnishing a good drinking-water supply, isolation of the sick, and a proper disposition of the night-soil, would unquestionably prove more effective.

A large number of facts were gathered, showing, as usually observed, that the great routes of travel were the principal means of spreading the disease from one part of the country to another. That a contaminated drinking-water supply was the immediate cause of an extended prevalence of the malady, in a number of large country towns especially, was demonstrated with great certainty. The places of this description which suffered most in this section of the empire were in nearly every case located at the foot of mountains, where the custom of directing streams of water through the streets was followed—this supply being too often used both for drinking and laundry purposes. A marked instance of contamination of wells by latrines was shown in the low-lying town of Hiramura, in this prefecture. The disease had already attacked a large number of its inhabitants, and was daily increasing. A commission was sent by the local Government, which closed all the wells and had a good supply of water brought in boats for the use of the entire population, a measure which resulted in a complete disappearance of the disease in a few days.

The very mild character of the epidemic of this year in this place (Yokohama) and the capital, compared with its fearful ravages in the southern cities of Osaka and Hiogo, appears somewhat remarkable. The first cases, it will be remembered, arrived here in the middle of June. Still its progress was very slow. I see no means of explaining this except by the severer sanitary measures enforced, due chiefly to the superior ability of the men composing the health boards here and in the capital and vicinity. In fact, some of the best talent which the country affords, both native and foreign, was called into requisition in this special service. The plan already referred to, that of supplying these and all other similar organizations with money from the treasury of the central government, appears a good one, relieving the prefectures of the burden, and thereby insuring prompt action. A hint is here conveyed well worth the consideration of other countries.

As stated previously, a considerable difference of opinion existed among the earlier observers of the disease, as to its nature. It appears difficult to understand this, in view of all the circumstances attending the mortality and spread of the epidemic then present. It is quite evident that the testimony of facts was allowed little weight with many such persons. A certain number of individual symptoms, it was said, were wanting to make the prevailing disease Asiatic or malignant cholera. I myself saw many cases, both in town and the hospital, in which small bilious stools were present, instead of the so-called typical profuse rice-water discharges of malignant cholera. From what I could learn, it was on this ground that the "Thomases" based their unbelief as to the nature of the disease, notwithstanding distinct evidence of infection, a rapid, fatal collapse, suppression of urine, and a 50 to 75 per cent. mortality. That the habits and customs of a people, race, &c., may influence the type of many diseases is well known. That cholera in Japan should not be an exception to this possibility is evident. As among all the foreign medical men here but two or three can be found who have now any doubt on this subject, it is unnecessary to pursue the discussion farther.

The treatment of the disease followed by those belonging to the modern, in distinction from the Chinese, school of medicine, has been that found in the more recent treatises on cholera. As the greatest severity of the epidemic showed itself at a distance from the centers of education, or in the western provinces, where a vast majority of the medical men still follow the Chinese system, but a small proportion of those attacked with the disease had the advantages of what would be called efficient medication. Still the mortality has but little exceeded the average of that in more enlightened countries. This certainly is not very flattering to our boasted healing art, founded on so much study and research in the treatment of disease. There can be no question as to the efficacy of sanitary measures, however, which furnishes a strong argument in favor of renewed and increasing efforts in perfecting this branch of science. In my own cases and those treated by my students who were detailed on special duty in the hospital of Yokohama, and for the instruction of medical men in the rural districts of this prefecture, opiates were but moderately used, except for the relief of the premonitory diarrhoea and pain or cramps in the abdomen and extremities—in the latter case hypodermically. Ice was freely given to quench the thirst. The vomiting sometimes yielded to from $\frac{1}{4}$ to $\frac{1}{2}$ grain of morphine, blown into the fauces or placed on the back of the tongue, when all other means had failed.

At the first appearance of the disease I determined to try the action of pilocarpine for the relief of uræmic symptoms, and also paracotoine where profuse diarrhoea was present, the latter medicine, I believe, having been first used by Professor Baelz, of the Imperial College of Tokio. In regard to the former, I am convinced that it will be found on further trial to be a drug of considerable value in many cases of this malady. Its action on the kidneys especially, when used hypodermically, was often more pronounced than on the skin—partially, no doubt, on account of the difficulty of keeping the patients covered up after its administration. In a number of cases I found, even

after suppression had lasted for several hours, and symptoms of coma had set in, that the kidneys would commence to act profusely, so as to saturate the patient's clothes and bedding. This was followed by a relief of the stupor, and final recovery, when such a termination had been regarded as almost hopeless. I found that a certain amount of caution was necessary, however, in its use, as the first depressing effect of the remedy appeared in two or three cases to have diminished the chances of recovery, reaction not having been sufficiently established. The results of my trials of paracotoine were less satisfactory. In two cases only did I find that it checked the diarrhoea; but in these its action was almost magical, very profuse rice-water stools entirely ceasing on the administration of two doses. If it has any real value, I am disposed to think it is only under such circumstances.

By a comparison of the weekly returns of the central sanitary bureau I find, even at this late date (December 24), that the disease has by no means ceased its ravages in those sections where it has been most severe, though in this place and Tokio no new cases have been reported for several weeks. The outlook for another year is therefore by no means encouraging. Meanwhile I understand that the central sanitary bureau is busily engaged in preparing an elaborate report from information furnished by returns from all parts of the Empire. When published, it will no doubt add largely to our knowledge of details of the past visitation, and supply valuable experience for the guidance of all concerned in coping with the recurrence of any similar calamity.

ON THE INFLUENCE OF THE HABITS AND CUSTOMS OF RACES ON THE EPIDEMIC PREVALENCE OF CHOLERA AMONG THEM.

So overwhelming is the evidence in support of the theory that cholera is propagated by means of the excreta or vomit of those suffering from the disease, that it would be a waste of time to reconsider the question here. In the same way it is superfluous to do more than take for granted that drinking-water is by far the most common medium for the transport and dissemination of infection. The influence of the habits and customs of races and nations upon the greater or less degree of contamination of their water supply, however, and the consequent effect of rendering the mass of the people more or less liable to epidemics of the disease are subjects which have not been so thoroughly studied. And yet the connection is a very intimate one, as becomes apparent when we investigate comparatively the habits and modes of life of the inhabitants of three widely distinct nations of Asia, which have of late years become much more accessible than they used to be to medical observers from the schools of the western world. The first point which presents itself is the source of the water supply; the second, the disposition of the night-soil.

The sources of drinking-water are: (1) artificial, namely, aqueducts, wells, or tanks; and (2) natural, namely, springs and streams or rivers. Whenever the nature of the soil will permit it, wells are by far the most common sources in the rural districts and smaller towns in all parts of the world, except in the mountain regions, where streams are turned into the streets, and serve the double purpose of drainage and of supplying the water used for washing, if not, by the less scrupulous, for drinking purposes also. As the facts which I have recorded have been especially drawn from India, China, and Japan, I will here briefly refer to the principal peculiarities prevailing on these points in each of the three countries.

INDIA.—Though the habits and customs of the native races of India have often been cited in connection with the present subject for the purpose of comparing them with those of other people, yet I will venture to restate them briefly here.

1. *Drinking-water supply*.—This is derived from (a) wells, (b) so-called "tanks" or artificial ponds, (c) the water-courses of the country.

(a) The wells generally resemble those in other parts of Asia.

(b) The tanks are excavations, often of considerable extent, made for the purpose of collecting the surface water during the rainy season and storing it up for the dry. Necessarily they are mere stagnant pools. The water is used not only to quench thirst, but is said to be drunk as a sacred duty. At the same time the reservoir serves as a large washing-tub for clothes, no matter how dirty or in what way soiled, and for personal bathing and ablution.

(c) The water-courses: Many of these are sacred, notably the Ganges, a river 1,600 miles long, in whose waters it is a religious duty for millions, not only of those living near its banks, but of pilgrims, to bathe and to cast their dead.

2. *Disposal of the night-soil*.—The Hindoo cannot be made to use a latrine.* In the

* The customs of the Hindoos are very peculiar in some respects. It is calculated that 150,000,000 of them always defecate on the ground. They have no privies or latrines, and even the native soldiers under British rule will not use them. A mutiny greater than that of 1857 might be produced if this necessary hygienic rule were enforced. Many thousands of tons of human excrement have thus been deposited upon the open ground for some thousands of years. Outside the large cities of India the bulk of the people always dwell in villages of from 2,000 to 10,000 inhabitants, and from 5 to less than 20 miles apart. The result has been the accumulation of enormous amounts of fecal matter, with a corresponding degree of saturation of the soil, and the consequent extensive pollution of water in every direction.—(Cholera Epidemic of 1873 in United States, p. 685.)

cities he digs a hole in his habitation; in the country he seeks the fields, the hill-sides, the banks of streams or rivers, when obliged to obey the calls of nature. Hence it is that the vicinity of towns and the banks of the tanks and water-courses are reeking with filth of the worst description, which is of necessity washed into the public water supply with every rainfall. Add to this the misery of pilgrims, their poverty and disease, and their terrible crowding into the numerous towns which contain some temple or shrine the object of their devotion, and we can see how India has become and remains the hot-bed of cholera epidemic. In the United States official report on this disease (pp. 683 *et seq.*) the horrors incident upon the pilgrimages are detailed with appalling minuteness. W. W. Hunter, in his Orissa, states that twenty-four high festivals take place annually at Juggernaut. At one of them, about Easter, 40,000 persons indulge in hemp and hashish to a shocking degree. For weeks before the "car festival," in June or July, pilgrims come trooping in by thousands every day. They are fed by the temple cooks to the number of 90,000. Over 100,000 men and women, many of them unaccustomed to work or exposure, tug and strain at the car till they drop exhausted and block the road with their bodies. During every month of the year a stream of devotees flows along the great Orissa road from Calcutta, and every village for 300 miles has its pilgrim encampments. The people travel in small bands, which at the time of the great feasts actually touch each other. Five-sixths of the whole are females, and 95 per cent. travel on foot many of them marching hundreds and even thousands of miles, a contingent having been drummed up from every town or village in India by one or other of the 3,000 emissaries of the temple, who scour the country in all directions in search of dupes. When those pilgrims who have not died on the road arrive at their journey's end, emaciated, with feet bound up in rags and plastered with blood and dirt, they rush into the sacred tanks or the sea, and emerge to dress in clean garments. Disease and death make havoc with them during their stay; corpses are buried in holes scooped in the sands, and the hillocks are covered with bones and skulls washed from their shallow graves by the tropical rains. The temple kitchen has the monopoly of cooking for the multitude, and provides food which, if fresh, is not unwholesome. Unhappily, it is presented before Juggernaut, so becoming too sacred for the minutest portion to be thrown away. Under the influence of the heat it soon undergoes putrefactive fermentation, and in forty-eight hours much of it is a loathsome mass, unfit for human food. Yet it forms the chief sustenance of the pilgrims and is the sole nourishment of thousands of beggars. Some one eats it to the very last grain. Injurious to the robust, it is deadly to the weak and way-worn, at least half of whom reach the place suffering under some form of bowel complaint. Badly as they are fed, the poor wretches are worse lodged. Those who have the temporary shelter of four walls are housed in hovels built upon mud platforms about 4 feet high, in the center of each of which is the hole which receives the ordure of the household, and round which the inmates eat and sleep. The platforms are covered with small cells, without any windows or other apertures for ventilation, and in these caves the pilgrims are packed, in a country where during seven months out of the twelve the thermometer marks from 85° to 105° F. Hunter says that the scenes of agony and suffocation enacted in these hideous dens baffle description. In some of the best of them, 13 feet long by 10 broad and 6½ high, as many as eighty persons pass the night. It is not, then, surprising to learn that the stenches are overpowering and the heat like that of an oven. Of 300,000 who visit Juggernaut in one season, 90,000 are often packed together for a week in 5,000 of these lodgings. In certain seasons, however, the devotees can and do sleep in the open air, camping out in regiments and battalions, covered only with the same meager cotton garment that clothes them by day. The heavy dews are unhealthy enough; but the great festival falls at the beginning of the rains, when the water tumbles in solid sheets. Then lanes and alleys are converted into torrents or stinking canals, and the pilgrims are driven into the vile tenements. Cholera *invariably* breaks out. Living and dead are huddled together, under a leaking roof, above a reeking cess-pool, and with no more space to lie on than they can cover. In the numerous so-called corpse fields around the town as many as forty or fifty bodies are seen at a time, and vultures sit and dogs lounge lazily about gorged with human flesh. In fact, there is no end to the recurrence of incidents of misery and humiliation, the horrors of which, says the bishop of Calcutta, are unutterable, but which are eclipsed by those of the return journey. Plundered by priests, fleeced by landlords, the surviving victims reel homeward, staggering under their burdens of putrid holy food wrapped up in dirty cloths or packed in heavy baskets or earthenware jars. Every stream is flooded, and the travelers have often to sit for days in the rain on the bank of a river before a boat will venture to cross. At all these points the corpses lie thickly strewn around—an English traveler counted forty close to one ferry—which accounts for the prevalence of cholera on the banks of brooks, streams, and rivers. Some poor creatures drop and die by the way; others crowd into the villages and halting places on the road, where those who gain admittance cram the lodging places to overflowing, and thousands pass the night in the streets and find no cover from the drenching

storms. Groups are huddled under the trees; long lines are stretched among the carts and bullocks on the roadside, their hair saturated with the mud on which they lie; hundreds sit on the wet grass, not daring to lie down, and rocking themselves to a monotonous chant through the long hours of the dreary night. It is impossible to compute the slaughter of this one pilgrimage. Bishop Wilson estimates it at not less than 50,000. And this description might be used for all the great Indian pilgrimages, of which there are probably a dozen annually, to say nothing of the hundreds of smaller shrines scattered through the peninsula, each of which attracts its minor hordes of credulous votaries. So that cholera has abundant opportunities for spreading over the whole of Hindoostan every year by many huge armies of filthy pilgrims; and the country itself well deserves the reputation it universally possesses of being the birthplace and settled home of the malady.

CHINA.—In spite of the proximity of this vast empire to India, and the fact that it is of much greater extent and twice as populous, we find that cholera, comparatively, is rarely epidemic there.

1. *Drinking-water supply.*—This is derived from (a) wells and (b) springs and natural streams. Now, though the wells and springs are used in China for drinking purposes to much the same extent and in much the same manner as in India, yet the rivers and lakes are not drunk from as part of a religious duty, nor is bathing in them a sacred rite. The absence of pilgrimages contributes to keep the water supply comparatively uncontaminated.

2. *Disposal of the night-soil.*—Human manure is valuable, and hoarded for fertilizing purposes. Hence the excreta are deposited by the individual in a receptacle made for the express purpose, and from motives of economy kept in a fairly good condition of repair. Even in cities and large towns latrines are not employed. Special wooden boxes are among the first necessities of bed-room furniture, and form part of every bridal outfit. The contents are daily emptied into earthen jars or wooden tubs placed in the court-yard of the house, whence they are in due course removed by the scavenger either direct to the fields or to boats destined to convey them to a distance. Thus the greatest amount of security attainable is provided against the contamination of the water supply from this source. A still more potent preventive of infection is to be found in the fact that the Chinese will always, if possible, boil water before drinking it, if even they are unable to make it into some kind of tea. Here it is easy to see, in the contrast presented between the customs of the Hindoo, on the one hand, and the Chinese, on the other, how in the one case every possible facility is provided for the propagation of infection; in the other, how the danger of contamination is reduced to a minimum.

JAPAN.—1. *Water supply.*—The sources whence this is derived are generally of the same kind as those relied upon in China.

2. *Disposal of the night-soil.*—The destination of the excreta is practically the same as in China. It is of value to the agriculturist, who employs it to fertilize his fields. An important difference exists, however, in the manner of disposing of it before it comes into his possession. The Japanese invariably use latrines. These generally consist of oil-tubs set in the ground, either in the house or its immediate neighborhood. Leakage or overflow may produce contamination of the water supply. In effect, notwithstanding the insular position of Japan and its remoteness from the home of the disease, as compared with China, it appears that in modern times the former country has suffered at least as frequently and severely as the latter from the ravages of epidemic cholera. The explanation is discoverable in the use of the latrine embedded in the earth in the one, the box and above-ground receptacle in the other.

NOTE ON THE DRINKING-WATER SUPPLY AND DISPOSAL OF THE NIGHT-SOIL AMONG WESTERN OR CIVILIZED NATIONS.

As is well known, the water supply is derived (1), and most frequently, from wells; (2) from streams, lakes, and other natural collections of water; (3) from aqueducts bringing water from distant sources to cities and large towns. In this respect, then, the West does not display any striking difference from the East, except perhaps in the more extended and careful use of conduits.

Disposal of the night-soil.—In this respect, however, the customs of the West approach more nearly to those of India than of China and Japan. In other words, the matter is not used as a fertilizer; but, as far as the great agglomerations of inhabitants in large cities are concerned, every conceivable means is taken to favor its discharge into the lakes or streams on whose banks the towns are generally situated, and whence, in case the water from proximity to the sea is not too salt for the purpose, the supply of drinking-water is largely drawn by the people. Secondly, the latrine system in use in all the rural districts, as well as in many large inland cities, consists of closets, the receptacles being deep pits sunk in the ground, often without any special means for preventing the contents from filtering through the soil, in fact even favoring the disappearance of the liquid portion in this manner, thus rendering the trouble of empty-

ing them less frequent. In districts where economy of space is of comparatively little importance, the latrines are located at the greatest convenient distance from the wells on the various compounds, though but little regard is had to the "run" of the land as regards drainage, or its inclination in a given direction. In densely populated localities, however, where only a few square feet of ground can be devoted to the "back yard," the privy is often found within a few steps of the well. Hence, with our present knowledge of the possibility of direct contamination of wells in certain soils, even when situated at a considerable distance from the source of filth infection, no lengthy argument is needed to prove that the Chinese, as a nation, run far less risk of widespread epidemic disease, propagated through the water supply, than do the civilized nations of western lands. It is comparatively only a few years ago that even New York and other great cities of the modern world began to be supplied with water by aqueducts from pure and distant sources, instead of from back-yard wells, and caused the excrements of the population to be conducted into sewers, instead of being collected in pit latrines. The effect of the old plan may be seen in the terrible havoc wrought by cholera in New York in 1832, before the citizens were roused to the ancestral folly which they were perpetuating. So it may be said of London during the earlier visitations of the disease, whose rapid dissemination was favored by the then barely dremat of action of the privy system upon the water supply. Since the development of the scheme of aqueducts and the improvement in sewage arrangements no such destruction as was before frequent has occurred in the large centers where they have been introduced, although the seeds of infection have frequently been imported thither. Thus, still pursuing the theory that when the germs of cholera are present in any given geographical locality the disease is epidemic and severe exactly according as the habits and customs of the people tend to the contamination of the drinking-water supply, we meet no difficulty in accounting for the greater frequency of cholera epidemics in one country than in another which at first sight might appear to be less exposed to its ravages. China furnishes an example of comparative immunity, remarkable when we take into account only those first impressions, derived from the crowded condition of her numerous vast cities, the disgustingly dirty habits of her people, and their ignorance of the most simple hygienic rules.

THE ATMOSPHERE AS A VEHICLE FOR THE DISSEMINATION OF CHOLERA GERMS.

We come now to the consideration of the manner in which the air may possibly become a medium for the conveyance of cholera germs, and the consequent spread of the disease. This can only be in two ways, namely, (1) by moist heavy vapor from infected sewers and cellars, or by inhalation during the process of washing clothing soiled by choleraic discharges; and (2) in the form of dust rising from the dried evacuations of cholera patients. There appears to be abundant evidence that under favorable circumstances the malady may be propagated by each of these means. Much difference of opinion exists, however, as to the extent to which germ-laden dust can be regarded as an agent of any potency in disseminating cholera, those most inclined to the affirmative opinion being observers in India. Among the practitioners of that country it is that the greatest number of advocates of the "miasmatic" doctrine of cholera is found, in opposition to the "contagionists," who believe in infection by germs derived only from the evacuations of those afflicted with the scourge. It is there, too, that we find exponents of the theory that drinking-water plays but an unimportant part in the work of propagation, thus opposing themselves to the opinions of almost all observers in other parts of the world. With reference to the "dust-infection" theory, we opine that, in view of the facts already cited in connection with the extensive deposit of the excretions of the population on the surface of the soil, there is sufficient reason to justify it. The air of Hindostan, especially during dry seasons, may well be poisoned by the germs it takes up and wafts hither and thither with the breeze. And here we can see how the question which we have raised as to the influence of the habits and customs of different nations upon their greater or less liability to the inroads of epidemic disease may help to explain the difference of opinion on certain points obtaining between observers in the Indian peninsula and those in western countries. Whereas in the latter places surface exposure can hardly be said to exist, the night-soil being collected in vaults and pits, or washed immediately into sewers and water-ways, in India it is practically universal; and the poison which the excreta contain may effectually impregnate its victims by means of two vehicles of propagation, namely, water and air. In western regions its medium is water only. Hence the divided opinion as to the source or cause of the disease among observers in the one case; their unity of belief in the other.

As we have seen, while the habits and customs of the three eastern nations which we have glanced at are distinctly opposite in the primary deposit of the night-soil, yet ultimately the substance is in each case destined to the same fate—that of exposure on the surface of the soil. Is this practice, then, it may be asked, not as much a cause of spread of the epidemic in China and Japan as in India, by dust as well as

by contamination of the water after the fifth has been so disposed off? A negative answer to this question may be promptly returned, and upheld by a very tenable hypothesis, to establish which we must briefly consider at what period of their existence the cholera germs are noxious. The question whether they are capable of producing infection at the moment of passing from an individual suffering from the disease, or whether a certain process of fermentation is necessary, has been often raised by investigators. That a certain amount of fermentation at least favors their development and increase is undoubted; but it is equally certain that the natural history of the protomycetes teaches us that their exuberant growth may be brought to an end, even when at the height of their destructive activity, by the development of other and harmless parasites (Lebert in Ziemssen's Encyclopedia, Vol. I, p. 371). Now, in India the excreta are deposited direct from the body onto the soil, not in masses but in separate spots; thence they are either quickly washed into water supplies or dried in the sun. In either case the germs are carried hither and thither rapidly and in great number, with their infectious principles latent or in a greater or less condition of development. In China and Japan the night-soil is first lodged in various kinds of receptacles. When favored by confinement in considerable masses it produces fermentation in various degrees, some of which tend to the development of other besides the choleraic parasitic growths. The longer and more complete the fermentation the greater then the chance of the destruction of the infectious germs by parasites innoxious to the human system, which thus render the whole mass harmless as a means of propagating the disease, even though particles may be taken up by air or water and broadly disseminated. Considering that, almost without exception, the manure is stored for a considerable time* before use by the farmer, and that in the receptacles the cholera-infected stools must, in the vast majority of cases, be but a small portion of the whole, it is easy to see how the harmless products of the entire fermentation will quickly gain the mastery over the specific ones of the cholera stools. Thus we arrive at an apparent solution of the question why the night-soil spread on the fields of China and Japan as a fertilizer, does not possess infectious qualities, even though originally mixed with matter containing cholera germs, and why in India the infected stools are, through their early deposition on the soil, active agents in the propagation of the pestilence. My repeated testings of the liquid manure in the vats of the peasants, while undergoing this preparation for use, during the hot season, have shown a slight acid reaction. Should this experience be borne out by further observation, we should find still another explanation of this supposed destruction of the cholera germs, as the power of acids to arrest their development, if not to destroy them altogether, is thoroughly recognized.

Hence it may be assumed that cholera evacuations are dangerous in proportion to their freshness or the limited amount of fermentation to which they have been subjected.† This position may be strengthened by further evidence, negative, it is true, but not without much value. If the theory were ill founded, the manifestations of the disease would be as extensive and severe in the rural districts as in the large cities. This, however, has not been the case, as I have special reasons to know from my own experience of the epidemics of the last few years. In all the towns and villages of this section of the country where cholera has declared itself, it has been in nearly every case directly traceable to a contaminated water supply. Numerous instances have occurred wherein the soiled clothes of a cholera patient having been washed in a stream passing through hamlets or villages, the first succeeding visitations were all *below* that point. Sometimes such cases were the only ones which followed. I may remark in passing that the devastation has been much less considerable in the plains than at the foot of mountains or in valleys, where the water supply has been derived from brooks which are led through the streets, and so are liable to contamination by leakage from closets or the practice of washing garments in them. In the village of Hiramura, situated at a very low level, the malady raged for a short time with great virulence. The Government closed all the wells, cleansed and disinfected the closets, and brought a pure supply of water from a distance. In a very few days afterwards the disease had disappeared altogether from the place.

Taking into consideration the geographical positions of China and Japan, the one touching, through her tributaries, the confines of the very hearth of the disease, the other enjoying all the advantages which insularity confers, we thus find that the latter country has relatively been more frequently and severely visited than the former. This is to be explained solely by the fact that a very bad latrine system, one which permits overflow, leakage, and filtration, and consequent contamination of wells, ob-

* In Japan the manure is sometimes allowed to remain for weeks or months in the oil-tubs or rocky vats prepared by the agriculturists for its preservation. In no case is it spread on the fields until it has been kept for a period of eight or ten days, to allow it to "rot," as the local phrase goes; in other words, to ferment to such an extent as experience shows will best fit it for field purposes.

† The same may be said of typhoid fever, a complaint comparatively rare in China. It also is a disease of germ origin in the intestinal canal, and bears very close relation to cholera in its mode of contagion and propagation.

tains in Japan, a condition of things which does not prevail in China, a country whose hygienic condition in other respects is far in arrears of that of her neighbor. The fact is of no inconsiderable significance, as the method of keeping and applying the night-soil as a fertilizer to the earth is identical in the two countries.

DISTOMA RINGERI AND PARASITICAL HÆMOPTYSIS.

BY PATRICK MANSON, M. D.

[From the Medical Reports No. 22, 1881, of the inspector-general of customs, China, transmitted by Col. John S. Mosby, consul-general at Hong-Kong.]

In the Customs Medical Reports, Vol. XX, page 10, I called attention to a new parasite the mature form of which had recently been discovered by Dr. Ringer in Tamsui, Formosa. I therein succeeded in associating this animal with a peculiar form of recurring hæmoptysis, common in one part, at least, of the Chinese Empire, which had hitherto not been understood; and I gave some particulars of a case occurring in my own practice in which the association was apparent. At that time I was unaware that Professor Baelz, of Tokio, had been working at the same subject, and it was not until I read in the *Lancet* of 2d October, 1880, a summary of a paper by this gentleman that I learned that this disease had been described by him, and that it was not uncommon in Japan. Although Professor Baelz, in the paper I refer to, errs in calling the bodies which I have proved to be the ova of *Distoma Ringeri*, gregarinæ, yet, though I do not know the dates of his investigations, the merit of priority in the discovery probably rests with him.

In my report I mention that in making a *post mortem* examination of a Portuguese dead of aneurism of the aorta, Dr. Ringer found a parasite in the lungs; that in the sputum of a Chinaman suffering from a chronic intermitting hæmoptysis I found certain bodies I had no difficulty in recognizing as the ova of a parasite; and that when these bodies and the ova emitted by *Dismota Ringeri* were compared they were found to be identical in size, shape, color, and contents.

Of the parasite discovered by Professor Baelz, the *Lancet* says that it is—

“Met with in two forms: (1) as yellowish-brown ovoid bodies of .13 mm. long and .07 mm. wide. They have a double contour, from a translucent wall, .02 mm. thick, which in different positions appears greenish or reddish, and at the larger end is a kind of cover, at which the cyst opens. The contents consist of delicate jelly-like material, in which are imbedded three or five aggregations of smaller bodies. The latter consist (a) of spherules about twice the size of a white blood corpuscle, colorless, with sharp outlines. Around these spherules, and more or less inclosing them, is (b) a coarsely granular material scattered through the jelly, and in it molecular movements may often be seen. When the spherules have left the cyst they show for a time the same movements, and then become invested with the granular substance, and become motionless.”

These bodies, he concluded, are a stage in the development of gregarinæ, and he therefore proposes to call the disease they are connected with gregarinosis pulmonum, and the parasite *Gregarina pulmonum* or *Gregarina fusca*.

As the above description applied pretty accurately to the ova of *Distoma Ringeri*, and as they were associated with hæmoptysis, I concluded they were identical, and wrote to Professor Baelz, requesting him to send me a specimen of the characteristic sputum from Japan. He very kindly did so, and I had no difficulty in seeing that the bodies he described were identical with those I was familiar with and with the ova of *Distoma Ringeri*. Indeed, in his letter to me the professor says that both he and Leuckhart had already suspected they might be the ova of a distom. That this view is the correct one will receive additional and corroborative evidence in the sequel.

During the last eighteen months I have made many unsuccessful attempts to find the ova of the parasite in the sputa of natives of this district. I suppose I have examined altogether about 150 individuals. Therefore, it is not at all likely that the disease is common in Amoy and its neighborhood. It is quite otherwise, however, in North Formosa, though only separated from us by some 200 miles of sea. Being anxious to attempt the development of the embryo, and despairing of finding supplies of ova in Amoy, I applied to my friend Mr. John Graham, of Tamsui, to find me some sputa. He answered my letter by sending me two bottles full of ova-laden sputum, one of which was filled by his house-boy, the other by his cooly. Dr. Johansen also recently sent me six specimens of sputum, three of which contained ova in abundance; of the ova-laden sputa one came from his hospital assistant, the other two from peasants living near Capsulan, a place about 40 miles to the southwest of Tamsui.

The facility with which these cases were found proves that the parasite must be very common about Tamsui; and Mr. Graham's servants, who some time ago both visited Amoy, told me that hæmoptysis, such as they themselves suffered from, was extremely common. Regarding their acquaintances, one of them said that 20 or 30 per cent., the other that 15 per cent., spat blood. Possibly these are overstatements, but at all events they show that the disease is extremely prevalent. With regard to Central and South Formosa, I recollect very distinctly my surprise at the large number of cases of hæmoptysis I used to meet with there, and have now little doubt that in *Distoma Ringeri* we have the explanation.

The geographical distribution of this parasite is peculiar, if it is the case, as seems probable, that it is rare or entirely absent on the mainland of China. We have Professor Baelz's authority for its existence throughout Japan. I suspect, therefore, that there is something in the soil or geological structure common to Japan and Formosa, but not present on the neighboring continent, that determines this apparent caprice in the *Distoma* area; and that this geological element, whatever it may be, is one necessary to the existence of the intermediary host. The distribution of similar parasites depends principally on the distribution of their intermediary hosts; this fact can easily be understood. Both Japan and Formosa resemble each other in being volcanic, and are both members of that long string of volcanic islands that, stretching along the eastern coast of Asia, includes, besides these, the Loochoos, the Bashees, the Philippines, and a host of smaller islands. I believe that extended inquiry will show that *Distoma Ringeri* exists in all of these.

Parasitical hæmoptysis can readily be diagnosed. There is a history of irregular intermitting hæmoptysis associated with a slight cough, and, in the intervals of more active bleeding, the expectoration once or several times a day of small pellets of viscid, brownish mucus. Violent exercise is apt to produce profuse hemorrhage, and irritation of the lung in any way so as to induce coughing causes the discharge either of quantities of blood or of the characteristic sputum. At the same time there are no objective symptoms of lung disease, and the patient probably enjoys good general health. Examination of a small portion of the sputum with the microscope at once settles the diagnosis. I many times examined sputa from the two cases I had under close observation for a considerable time, and never failed to find abundance of ova, sometimes counting as many as twenty in a single field.

The following are short notes of the two cases I refer to; I am told they are typical examples of the disease as found in Formosa:

"Heng, male, æt. thirty-one; resides in Sinhang, Tamsui, where he works as a house cooly. His family, he says, is quite healthy; his mother, aged forty-four, and three brothers and four sisters, are alive and well. His father died at fifty-eight of dropsy, and a sister died in childhood of small-pox. He himself is liable to ague. He was born in the town of Banka, and lived there till his eighteenth year; then he lived in Kelung for two or three years; afterwards he removed to Hobe, Tamsui, where his home has been for the last ten years. He has traveled about the north part of the island a good deal; been in Tekchham two or three years ago; and eight years ago accompanied some Japanese to Khilai, on the east coast, where he resided for upwards of a month. His blood-spitting dates from eleven years ago; he was then working on the tea hills with his father, near Banka. At first he noticed when he breathed hard in carrying heavy burdens that he coughed a little and brought up mucus mixed with blood; from that time till now has spat blood more or less constantly; some days none, other days a considerable quantity. Once when pulling in a boat about two years ago he suddenly brought up over a bowlful of pure blood, but, as a rule, unless exerting himself violently, he only brings up a few drops mixed with the mucus. Sometimes he does not spit for a few days, perhaps a month on end, and then the hæmoptysis recurs, to last for one or two months. He has a slight cough, but on auscultation nothing much amiss can be detected. His thorax is very finely developed. He says that he never exercised discretion about the water he drank, especially when young; used to take it from river, well, paddy-field, or ditch, whichever lay most convenient, and he says that nearly all North Formosans are similarly indiscreet."

Heng lived in my house from the 14th to the 31st July, and during the whole of this time he could nearly always cough up blood or ova-laden mucus such as I have described.

"Heo, male, æt. twenty-two; born and resident in Hobe, Tamsui; a house-boy. Father and mother are both dead, both of them of some dropsical affection. Until he was eighteen years of age enjoyed excellent health; then, without any obvious cause, he began to spit blood, especially after making any very great exertion. During one year, many times each month, he continued to spit blood, about an ounce at a time. He then got lighter work and the bleeding ceased, and has not recurred; but he has a cough still, and almost every day expectorates pellets of tenacious, muddy, yellowish brown mucus. Sometimes for several days, if the weather is fine and his work is light, there is no cough or spit; but when the weather changes, or he has to exert

himself, the cough and spit return. He complains of some pain about the left nipple, but the lungs appear healthy. His sputum is as described, and abundance of ova can be found in it."

When examined with the microscope the ova of *Distoma Ringeri* are seen to be shaped very much after the fashion of a fowl's egg, with the exception that a circular operculum about half the breadth of the egg closes the broad end. On an average they measure about $300'' \times 180''$, but some specimens are slightly larger and others slightly smaller. There is considerable diversity likewise in shape, some being more globular than the majority, whilst others are more elongated and tapered towards the narrow end. Their color, which, when blood is entirely absent, as is sometimes the case, imparts the characteristic brownish tinge to the sputum, is a dirty reddish brown, and appears to reside both in the shell and in the granular portion of its contents. The shell is without markings, and shows in double outline, more especially when it has been fractured by pressure. When viewed with a high power the ovum is seen to contain one, two, or more well-defined, pale, sarcoide globules embedded in a structureless matrix containing abundance of irregularly disposed dark granular matter. Usually one of these sarcoide globules is brighter and better defined than the rest. By careful focusing they are seen to be made up of very minute granules in a state of active molecular movement. Pressure ruptures the shell at the opercular end, forcing out the contents, which resolve themselves into innumerable globules of all sizes, from fine microscopic granules to large bodies $300''$ in diameter. The smaller particles exhibit very active molecular movements, and tend after a time to coalesce round the larger. No trace of a differentiated embryo can be distinguished. Once or twice I have seen attempts at yolk cleavage, a dozen or more elongated cell-like bodies with a bright nucleus in each occupying the whole of the interior of the egg; but never anything more advanced than this.

It is evident, therefore, that some time must elapse before an embryo can be sufficiently developed to start on the independent existence which has been found to be the first step in development in those distoms whose early life history has been studied. Reflecting that the ova are deposited in the sputum, that this affords probably their only means of escape from the human lungs, and that they are placed in it with a purpose, I concluded that by following out the destinies of a sputum I should probably be set on the right track for working out the first stage at least of the history of *Distoma Ringeri*.

When sputum is cast on the ground one of three things may happen: first, it may be eaten by earth-worms, mollusks, or other creatures; second, it may dry up and mix with the soil, the solid parts of it being perhaps afterwards blown about as dust; third, it may be washed and carried away by rain into well, ditch, pond, or river. I considered that if in any of these ways the ova are borne to suitable incubating media, the last is the most likely to favor the development of the distoma, and most in consonance with what happens in the case of better known species. Accordingly I determined to imitate nature as far as I could in this direction, on the supposition that rain or water was the first agency that operated on the ova. I procured two supplies of sputum from the man Heng; one lot I placed, without admixture of any sort, in a wine-glass and covered it up, keeping it for comparison and future experiment; the other lot, measuring about 1 ounce, and containing many thousands of ova, I shook up with about an equal quantity of filtered well-water until the mucous blood and ova were thoroughly diffused. This was divided into about equal portions between six wine-glasses, and water sufficient to fill the glass was added to each. These were numbered 1, 2, 3, 4, 5, 6, and placed under a glass shade, in a room where, during the subsequent steps of the experiment, the thermometer ranged between 80° and 94° F. Next day No. 1 was not disturbed, but all water, except the drachm or two at the bottom of each glass, containing the sediment and ova, was removed by means of a syringe from 2, 3, 4, 5, and 6, and fresh water added. On the following day 1 and 2 were not disturbed, but 3, 4, 5, and 6 were again watered, and so on. Thus in No. 1 the ova were washed once, in No. 2 twice, in No. 3 thrice, in No. 4 four times, in No. 5 five times, in No. 6 six times, the washing taking place at intervals of twenty-four hours. My notes of observations show that no development occurred in the unwashed ova; that it was delayed in No. 1, where only one washing had been performed; that it advanced steadily without much notable difference in 2, 3, 4, 5, 6, until at the end of from six weeks to two months the majority of the ova produced active ciliated embryos. A small quantity of sediment from one or more of the glasses was removed with a pipette daily, or every second day, and examined under the microscope. Ova were always easily found. For the most part they were entangled in little flakes of miscellaneous *débris*, but from this they could easily be separated. Notes were made of the various changes as far as they could be detected; but for the first few weeks, on account of the dark granular character of the contents, it is difficult to say precisely what the different steps were that led up to the formation of the mature embryo. Great molecular activity can be detected in the paler globules for some time; then these lose their distinctness, large oil globules appear about the periphery of the



Fig. 16.

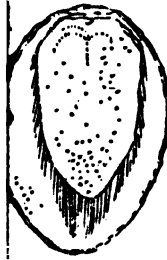


Fig. 17.



No. 2.

Fig. 20.

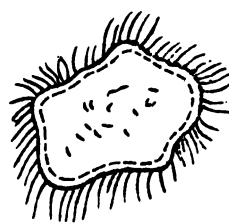


No. 3.

Fig. 24.



Fig. 25.



yolk, and a paler mass shows in the center (Figs. 1 to 11). In time the latter contracts, leaving the shell by a considerable space. Languid movements issue in it; these become more active; a ciliated epithelium is developed on its surface, and an indentation at the opercular end indicates the presence of a mouth of some sort.

On the twenty-sixth day of incubation I note: Examined some sediment from No. 3, and in it found an ovum of characteristic shape and color with an embryo in it possessing considerable activity and plastic power. It moved vigorously in the shell, and altered from time to time the shape of its body, which for the most part was heart-shaped, a distinct depression existing at the opercular end. Contents of the body granular. No vessel visible. No cilia visible when in ovo, but on crushing the egg the ruptured embryo escapes, and its collapsed integument is then seen to be covered by long cilia, which keep in active movement for about one minute. Examined No. 4, and found several ova with active embryos of the same character. Also No. 1, but in it there appeared to be no advance in development (Figs. 12-19).

On the twentieth day I note: In all the glasses except No. 1 the ova contained ciliated embryos. If carefully expressed, the embryo retains its activity for eight or ten minutes after its escape. It rushes off from the egg a globular, ciliated, rotating ball. As movement subsides the body elongates, and a ciliated epidermis is seen to extend from the tail as far forward as the anterior third or shoulder of the animal. The anterior part is naked, and at its apex is provided with a papilla, or beak.

The body of the animal evidently lies free in the shell, the cilia motionless at this stage and directed backwards. If we watch the anterior part or head, which is always directed to the operculum and for the most part closely applied to it, it is manifest that this is fixed in some way. By careful examination of ova at a later stage of development I have satisfied myself that this is effected by an involution of the delicate membrane lining the shell, which here becomes continuous with the ciliated epidermis of the body; thus the neck is surrounded by a sort of collar, which keeps it a fixed point (Fig. 20). The movements of the animal during the last few days of its residence in the egg appear to be directed to rupturing this connection, for the head is first turned forcibly to one side, then to another, expanded, contracted, and jerked about, as if the little thing were annoyed and irritated by the collar restraining it. When this has been ruptured the embryo moves about in the shell, trying in an excited sort of way to escape, the cilia vibrating rapidly. Frequently, failing to force the operculum open, it turns completely round and energetically butts the opposite pole of the ovum with its head. After a time it succeeds in opening the operculum, which is either carried completely off, and may be found lying at some distance, or is thrown back, as if on a hinge.

If we rupture an ovum very carefully a week or two after the appearance of the cilia, and are successful in extruding the little animal without crushing its delicate tissues, it will move away from the shell a short distance, its body elongating and contracting, and the cilia playing rapidly for a few minutes. Gradually all movements will cease, the body passing from heart-shape to spade-shape, the handle of the spade being represented by a minute papilla with a very fine canal, apparently opening at its apex. Now it may be distinctly seen that the ciliated epidermis does not cover the fore part of the body, only the posterior two-thirds, extending as far forward as the rounding in of the shoulder; also that the epidermis is in plates, one covering the tapered posterior end, and two other indistinct lines in advance of this, indicating that altogether there are three or four such plates or bands. Soon after extrusion the homogeneous or finely granular contents present larger globules, containing actively moving granules, and as the feeble contractions of the body and ciliary motions cease these granular globules increase in number, until finally the entire mass is made up of minute dancing micrococcus-like particles. Then the epidermic plates roll up, leaving the body quite naked, the cilia fade from view, and finally an amorphous mass is all that remains (Figs. 14-19).

If, however, we rupture the ovum at a later stage of development, or if our observations are made just when the embryo has squeezed its plastic body through the natural opening, the behavior of the embryo is somewhat different. First, the cilia are seen to start into rapid motion, and then, after a preliminary pause, to rupture and separate itself from the lining membrane of the shell, which is sometimes forced out entire along with it, or, apparently to consider what has happened, the animal rushes off at great speed, gyrating about after the manner of certain infusoria. From time to time it pauses, contracting itself into a perfect disk or globe, rotating rapidly on its axis, first in one direction, then in another. Anon it dashes off to a distant part of the slide, exhibiting in its course many diversities of form. When going at high speed the body is much elongated; at a less speed oval or fiddle-shaped or square; but at no time is the beak or naked shoulder protruded as long as the animal is alive and active, a slight depression on the ciliated surface alone indicating where these are retracted. Beneath the epidermis is a thick contractile layer; the interior appears to be fluid or a soft jelly, holding minute granules in suspension, and sometimes a larger bright point can be detected. No vessel of any sort can be traced. I do not

know how long the animal preserves this active ciliated form. I have kept one alive in a glass cell for over twenty-four hours (Figs. 21-25).

Such, briefly, is the history of the first step in the development of *Distoma Ringeri*. The ova are laid into the bronchial mucus; in the sputum they are cast on the ground; by rain or other means they are carried to stagnant water; they sink to the bottom; in the course of six weeks or two months ciliated embryos are developed; when mature these force their opercula and swim free in the water. What the next stage may be can only be conjectured. Doubtless they enter the body of some freshwater animal to undergo further metamorphoses. Perhaps this animal is eaten by man, or possibly the parasites once more obtain their freedom, and, while still in the water, are swallowed, and thus obtain an opportunity of gaining access to the human lungs, their final destiny.

I have not spoken yet of the fate of the unwashed ova. The glass containing them was not disturbed for about three weeks. At the end of this time the sputum had decomposed, stank abominably, and had settled into two layers, one upper, more or less clear, and a lower, turbid and dark brown. On sampling the lower layer, into which the ova might be supposed to have gravitated, but few specimens could be found. These, however, were, as far as I could judge, in no way different from perfectly fresh specimens. The sputum was then washed repeatedly with fresh water; but although in the sediment ova were numerous, no decided advance in development could be detected; on the contrary, in many signs of decomposition were apparent at the end of two months. In others, again, the characteristic globules of sarcodae could still be distinguished. Thus it would appear that unless the ova are freed from mucus and have access to fresh water within a short time of their birth they perish. If, however, water is supplied to them soon after they leave the lungs, though in limited amount, as was done in the case of glass No. 1, they do not rot, but retain their vitality, proceeding slowly in development. In the case of the ova in this glass the embryos were not differentiated till about the fortieth day.

It is evident, therefore, that the ova must be brought into contact with water, and that that is the medium through which the parasite and the disease it produces pass from one human lung to another. In the history of this parasite we have another argument, if such is needed at the present day, for a pure-water supply. Not many months ago there were few who would not have laughed at the idea that blood-spitting could be produced by a draught of dirty water. Now this connection can be demonstrated. How many more diseases acknowledge impure water as one of the most important factors in their etiology time and the advance of science will show. This matter of *Distoma Ringeri* and parasitical hæmoptysis may have little practical interest for any but some 40,000,000 or 50,000,000 of Asiatics and the few hundreds of Europeans who live among them, but it is a valuable text for the advanced sanitarians of Europe to work on and preach from, to show that to-morrow some new fact may disclose unsuspected connections between disease and uncleanness.

By these observations the search for the intermediary host is limited to a comparatively small group of animals. It must be an inhabitant of fresh water; it is common to Japan and Formosa; it does not inhabit or is rare on the mainland of China—at least that part of it near Amoy. The latter circumstance has precluded me from pursuing the investigation further, but I trust it will be taken up and successfully completed by some one residing in Formosa or Japan, who, being in the midst of the disease, must enjoy ample opportunity. The limitation of the field in which investigation need be made must simplify the search, but that it will be a short and easy one does not follow. The history of the liver fluke, the cause of so much disease in sheep, is not yet complete, notwithstanding the great inducements and facilities offered to its investigators in Europe and elsewhere.

On discovering the cause of parasitical hæmoptysis, the first thought that suggests itself is the possibility of curing it. Could the parasite be killed the disease would be arrested. An important point bearing on this question has yet to be ascertained, and that is the exact site of the parasite in the lungs. Is it free in the bronchi, or is it jammed into the branches of the pulmonary artery? If the former, the parasite may be dislodged; if the latter, the prospect of cure must be very small indeed. An autopsy is necessary to settle this point, and I trust our *confrères* in Japan will bear this point in mind when they get the opportunity. The exact position of the mature parasite could easily be ascertained by microscopical examination of bronchial mucus; the appearance of ova in a particular tube would show that the animal is to be found by following up that lead.

Proceeding on the assumption that the parasite had its habitat in the bronchi, I made several attempts in the two cases I have given to kill or dislodge it. I caused the patients to inhale the spray of solutions of various drugs atomized by a Lister's steam apparatus. In this way the tincture and infusion of quassia, the infusion of kousso, solutions of turpentine and santonine in spirits of wine were introduced into the lungs. In addition to these the man Heng inhaled the vapor of burning sulphur. Inhalation was practiced twice daily for a week in one instance, and for a

fortnight in the other. Certainly before these men passed from under my personal observation they were improved so far as cough and expectoration were concerned, but in both instances a small amount of ova-laden sputum could still be procured, irritating the lungs and inducing cough. They returned to Tamsui before I could be sure that the case was complete. In reply to my inquiries Mr. Graham wrote me lately that Heng still spits small quantities of blood at long intervals, but that Heo has now no cough and can no longer bring up distoma mucus. He possibly is cured.*

I am sorry I have not been able to carry further these experiments in treatment. I would not allude to them now had I much prospect of being able to extend them. I mention them only in the hope that others with opportunities better than those I enjoy will pursue the inquiry in this very practical direction.

Our knowledge of the history of the ovum and the medium in which it is developed indicates the direction which effort at prevention should take. But I fear our knowledge in this instance is a little in advance of any prevention we may look for in a Formosan. Europeans who happen to be stationed in Formosa, or who may be traveling in the island, will understand from these remarks the necessity for extra caution with regard to drinking water. They should never neglect to boil or filter it when the least suspicion is entertained about its purity. A little neglect in this matter may be paid for with a chronic hæmoptysis.

ON THE PERIODICITY OF FILARIAL MIGRATIONS TO AND FROM THE CIRCULATION.

By PATRICK MANSON, M. D.

[A letter to Dr. Cobbold.—From the Medical Reports, No. 22, 1881, of the inspector-general of customs, China, transmitted by Col. John S. Mosby, consul-general at Hong Kong.]

Although in the paper I sent you some time ago I refrained from speculating on the cause of filarial periodicity (because I had nothing but guesses to offer), yet I have thought a good deal about what might be the reason of this most remarkable phenomenon, which, as you say, "savors of the marvelous." As Dr. Mortimer Granville remarks, it is well deserving the attention of physiologists, for could we ascertain what the subtle influence is that sets these creatures circulating in the blood stream and arrests them with such "military punctuality," we probably would let new light in on many an obscure problem both in physiology and pathology. It was with the intention of providing myself with a standard with which to compare the results of observation and experiment that I prepared the chart I send you. If it is published, it may help others who are willing to work on this subject, but who may not have the opportunities of the continuous observation it records.

Dr. Mortimer Granville's ingenious speculations are based on the assumption that the phenomenon of periodicity depends in some way on sleep, either on the mechanical changes in the circulation when the body is in the recumbent position, or in the different proportions of oxygen in the blood, or in relative alterations of blood and tissue temperatures during the waking and sleeping states. Now, as the embryos begin to appear hours before the usual time for repose, and are in no way sensibly affected by changes in the hours of sleeping and waking, it is evident that the power which fixes them and lets them loose operates independently of the sleeping state. It is associated with the advent of night, but not of sleep.

Part of Dr. Mortimer Granville's note is so much to the point that I will quote it: "The change of place may be fairly ascribed to change of state. Looking at the habits of life in the lowest organisms, it can scarcely be supposed that the periodicity can depend on the state or requirements of the filariæ. It is not likely that the parasite needs repose or that it resorts to special localities to feed. It seems more probable that the state of the circulating fluid determines the presence or absence of the filariæ in the main current by night and day respectively." The first part of this I quite agree with, but the latter part I am not quite so sure about. What is the difference between the state of the circulating fluid at 4 p. m. and 6 p. m. respectively? It is evident that something happens between these hours which liberates the embryos. I do not know that physiologists have demonstrated or even supposed some

*I had an opportunity of examining Heo three months after the attempts at cure above described. He said he was quite well; that he had lost his cough; had spat neither blood nor mucus, and that he regarded himself as cured. I caused him to inhale irritating substances, and thus forced him to cough violently, but he failed to bring up any trace of distoma sputum. He told me that my other patient, Heng, still spat blood; and he also brought me three specimens of ova-laden sputum from three of his friends in Tamsui.

sudden change beginning in the blood between these hours.' Again, the conditions permitting the free circulation of the parasites continue with increasing effect up to midnight, and the restraining influences which fix them are gradually reapplied from that time till they effect also complete fixation by 9 or 10 o'clock next forenoon. What alteration in the physiological state of the blood or body generally corresponds to these hours? If you refer to my chart you will find no explanation in the rapidity of the circulation nor in the temperature of the body. For sometimes the pulse is quick when the embryos are numerous and sometimes it is slow; sometimes the temperature fluctuates a degree without apparent effect on the numbers circulating.

Whatever the cause may, be it certainly operates *through* the body, the medium in which the parasites are, but I very much incline to think that, though operating through the body, it is placed *outside* of it.

Of one thing we may be quite certain, that from the fact of the periodicity being one of twenty-four hours, its remote cause is the rising and setting of the sun, or rather the altered relation of the earth's surface to the sun recurring every twenty-four hours. Of another thing we may be certain, that the immediate cause is applied between the hours of 5 and 7 p. m. What, then, is the phenomenon in nature which, depending on the position of the earth's surface to the sun, begins to operate on the human body with the utmost regularity between the hours of 5 and 7 p. m., increases in power up to midnight, wanes towards morning, and finally ceases to act between 9 and 10 a. m.? A correct answer to this would be a step towards the solution of this strange problem; only a step, however, for the method of its operating would still remain to be explained.

We may dismiss at once the diurnal variations of atmospheric temperature and pressure, for although, especially in these latitudes, these daily ranges are pretty constant, yet when completely inverted, as sometimes happens, and as you may see from a comparison of the chart and meteorological register, there is no corresponding disturbance in filarial periodicity.

In casting about for the answer two things occur to me: First, the rays emanating from the sun undergo about these hours marked alteration in their proportions and power; second, the magnetic condition of the earth suffers a change about the same time.

I am inclined to dismiss the former as the *direct* cause, for were the sun's rays the *direct regulating influence* we might expect to find the rhythm assumed by the embryos affected by the presence and absence of clouds, &c. This is far from being the case, as you can see by comparing the chart with the meteorological register. The periodicity bears no relation whatever to the hours of sunshine, cloud, or rain, or other condition influencing the quantity or kinds of rays impinging directly on the human body, at least so far as I can see; but with terrestrial magnetism the case is quite otherwise. Its variations are rhythmic. If you consult authorities on the diurnal variations of the declination and inclination of the compass and intensity of terrestrial magnetism, you will find a marvelous correspondence between the rhythm of these phenomena and that of filarial periodicity. For example, the needle of the compass crosses the magnetic meridian, or mean daily position, between the hours of 9 and 10 a. m. and 6 and 7 p. m.; during the night and early morning the north end of the needle is to the east of the meridian, during the day to the west, and the hours when the meridian is crossed correspond pretty closely to the times of change from rest to activity, and *vice versa*, of the filaria embryos.

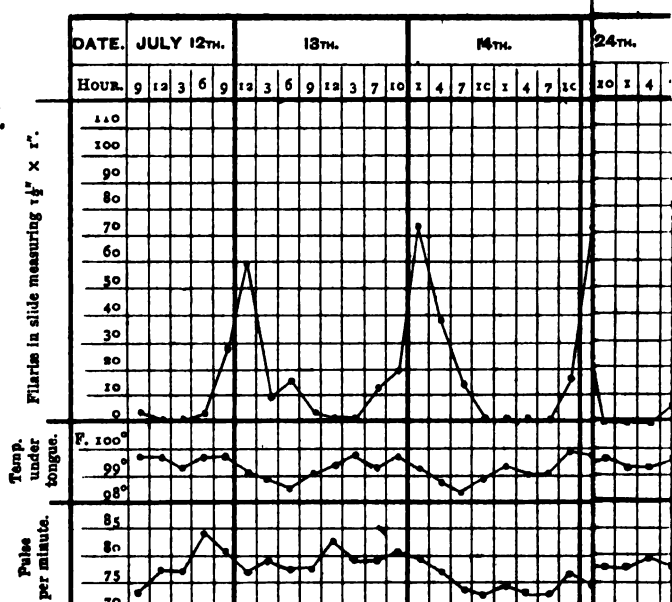
Again, the minimum of daily change of terrestrial magnetic intensity is between the hours of 10 and 11 a. m. and the maximum between 4 and 7 p. m., varying slightly with the season of the year. These hours correspond very closely with those of commencing rest and activity of the filaria in the normal state of the body. There is no proof whatever that there is any cause and effect relation between these two phenomena, but the coincidence is most striking, and suggests further investigation. If experiment should show such relation, it would be interesting to know if the cause operated directly, or if the effect on the embryos depended on physiological changes in the body the result of terrestrial magnetism.

These may seem wild and unjustifiable speculations, but I only offer them for what they are worth, and desire to separate them by a clear and well-defined line from my facts. But the imagination has its place in science, I believe, as well as rigid observation and induction. At any rate, actuated by these speculations, I have made one or two crude and unsuccessful experiments. I wish very much some expert in physiology and electricity would take the matter up. My knowledge is so limited, and the apparatus I can command so rude, that I despair of being able to give the answer myself. I believe a systematic examination of the compound force called light and of terrestrial magnetism in their influence on these worms would give most valuable results, not only in solving this most interesting problem, but in opening new and fertile fields in physiology and pathology.

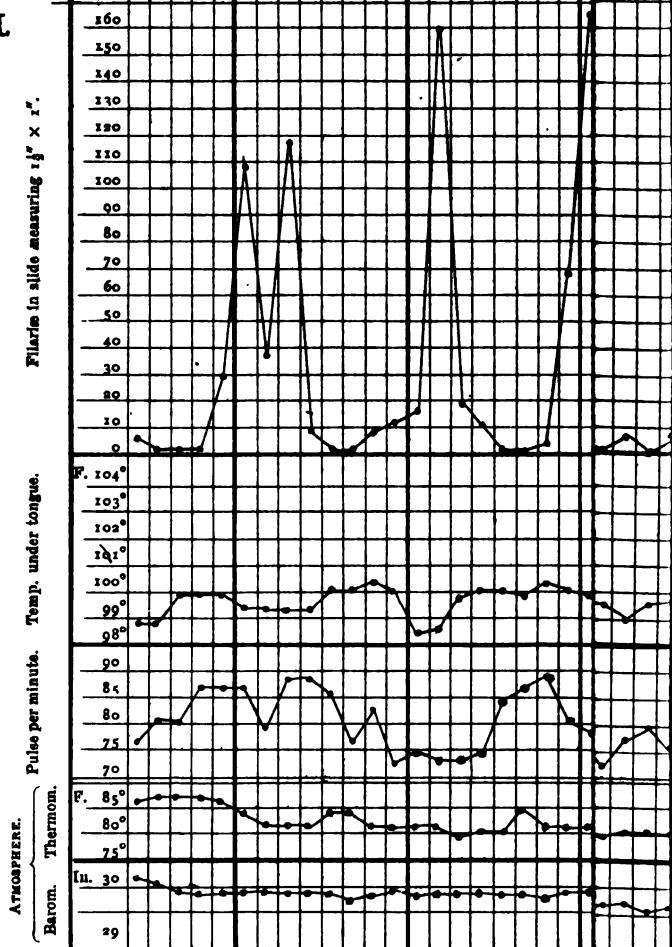
I do not anticipate much from observations on the disturbing effects of drugs and the febrile state. These undoubtedly in the future will be found to have an influence



I



II



on filarial periodicity, and it is possible this study may lead to just conclusions as to the cause of the phenomenon. It is not likely, however. The conditions of experiment become in such cases almost too complicated to unravel. We must be careful to bear in mind that substances or forces which interfere with the periodicity may have nothing in common with its normal cause. Assuming that quinine has this power, it would be absurd to infer that the presence or absence in the blood of this drug had anything to do with normal periodicity. It is only by the exclusion or inversion of the cause that we may hope to arrive at correct conclusions.

I have written more than I intended about my speculations on this subject. The great interest you take in these matters is my excuse, and I hope you admit it.

I will leave speculation alone now, and pass to the facts in explanation of the chart I have sent you.

The chart records a series of observations on the blood, temperature, and pulse of two Chinese lads ascertained to be filarious, and were in the main made by themselves. After enlisting them in the cause, and before commencing systematic observations, I trained them to recognize and count the embryos with the microscope, to read accurately the clinical thermometer, and to record correctly this and observations on the pulse, barometer, and ordinary thermometer. I took care from time to time to satisfy myself that their observations were carefully made and recorded, and I believe if there are any errors in the chart they are few and unimportant. Observations were made every three hours, day and night, during one month. At first the hours selected were 12, 3, 6, 9, 12, 3, 6, 9; but after two days it was found convenient to change them to 1, 4, 7, 10, 1, 4, 7, 10. The quantity of blood was as nearly as possible the same in each examination, just sufficient to form a thin workable film fully occupying a covering glass $1\frac{1}{4}$ inches by 1 inch. The inevitable differences in the quantities examined probably accounts, in part at least, for discrepancies in the number of embryos found at corresponding hours on different days. Notwithstanding this unavoidable imperfection, the microscopical observations serve their purpose, and in the main may be relied on. The same clinical thermometer was used throughout and by both lads. The instrument, I found on comparing with two others, is too high set; this circumstance explains the range of normal temperature being in the 100th instead of the 99th degree, as is usual.

Food of the kind usually consumed by middle-class Chinese, viz, rice, a little pork or beef, salted and fresh fish and vegetables, was taken at 7 a. m., 1 p. m., and 7 p. m., or thereabouts. Sleep during the night was constantly interrupted to take observations, and consequently was frequently indulged in during the day. The meteorological observations recorded in the chart were made with an ordinary large aneroid barometer with thermometer attached. The instruments, though good enough for the purpose in hand, are probably not perfectly reliable. I have accordingly procured from the customs a copy of their meteorological register corresponding to the period of these observations. This is very accurately kept, and may be trusted, with the exception of the afternoon readings of the thermometer. In consequence of the faulty position of the instrument they stand 3° too high during the afternoon.

Both lads come from Hooihoah, a filarious district, some three days' journey to the north of Amoy. They have resided in Amoy but a very few months. Li Kha (I in the chart) is twenty-one years of age, of average size, and in good health. He has no history of fever or any serious disease. Tiong Seng (II in the chart) is twenty-one years of age, and is fairly well nourished. When about fourteen he had what he called ague (what I call lymphatic fever), and from that time till now has, on an average, an attack about once a month. The attacks begin with giddiness, weariness of the body and limbs; this gradually merges into a cold stage, with moderate rigors of two or three hours' duration; then succeeds a hot stage of very high fever of twenty-four hours' duration, terminating in moderate diaphoresis, lasting for an hour or two. The fever is accompanied by complete anorexia, and during its continuance the inguinal and femoral glands invariably swell up and pain him excessively, those on the right side being affected more than those on the left. Unless the attack of orchitis or inflammation of the tunica vaginalis, to be hereafter alluded to, he has never had any trouble about the genitals or limbs, nor any signs of elephantoid disease. There is manifestly nothing of an ague type about these fever attacks. Though recurring about once a month (he had another attack without orchitis, however, on the 18th and 19th August); they are single, not quotidian, tertian, or quartan.

The first three compartments on the chart refer to Li Kha (I), the second three to Tiong Seng (II), and the two lowest are occupied by readings of thermometer and barometer. At the margin are numbers referring to number of filaria found, temperature of body, beats of pulse per minute, &c. Along the top the figures refer to the date and the hour of the day.

One or two things require a little explanation. The effect of the *febrile state* is well shown in the case of Tiong Seng (II). From the 12th July, when systematic observation commenced, till the afternoon of the 16th, he was in his usual health, though his

temperature ranged rather high, and the filarial rhythm was perfect. At 1 p. m. on the 16th, after being out of sorts all the morning, he had a rigor, followed by rapid rise of temperature and smart fever; at 4 p. m. he took 5 grains of quinine; by 10 p. m. inflammation of the right tunica vaginalis, with effusion and perhaps orchitis, declared itself, and the groin glands had become painful and swollen. Next day he was quite confined to his bed, inflammation continuing. He took three doses of quinine of 5 grains each during the day. On the 18th fever and inflammation had subsided, and he took only two doses of quinine. On the 19th the fever and inflammation relapsed, and he had an attack of a sort of convulsive hysteria; that day he had three doses of quinine. On the 20th he was better, and on the morning of the 21st was entirely free from pain and fever. The swelling of the testicle and glands gradually subsided. Contrast the behavior of the thermometer and of the embryos during and immediately after the attacks. The disturbance in periodicity did not begin for some time after the thermometer had risen, and it continued for days after the temperature had fallen to the normal standard. My inference is that the mere elevation of temperature has not *per se* any effect on the periodicity; it would show at once were this the case; chemical or other pathological changes consequent on the febrile state have an effect, and until these changes are eliminated or subside, filarial rhythm is interfered with. The effect of the fever seems to be to prolong the period of remission, to diminish the number circulating at the time of maximum, and prevent complete fixation at any time.

As the quinine taken during the attack might have had some disturbing influence, I tried the effect of a large dose on Li Kha (I) on 26th July; 30 grains were taken in three doses of 10 grains each at intervals of one hour, beginning at 10 a. m. On the following day you see the pulse rose, the temperature fell, and comparatively few embryos could be found circulating, and their ingress that evening appeared to be delayed; but by 1 a. m. on the 28th they were as numerous as ever, and thenceforward periodicity and numbers continued as before the experiment. I cannot say, however, that this slight perturbation was the result of the quinine, for Tjong Seng (II) was treated exactly in the same way on the 29th, but periodicity and numbers were in no way affected.

Nitrite of amyl (15 drops) was inhaled by Li Kha (I) at 10 a. m. on the 25th. There were no embryos in the blood when inhalation commenced; shortly afterwards two were found in one slide, three at 1 p. m., two at 4 p. m., none at 7 p. m., eighteen at 10 p. m.

Santonin (4 grains) was given Li Kha (I) at 10 a. m. on the 29th, and the same dose at 7 p. m. No effect apparent.

Turpentine spray inhaled by Li Kha (I) at 10 a. m., 1st August. No result.

Quassia tincture spray inhaled for 11 minutes at mid-day, 1st August, by Tjong Seng (II). No result.

Besides these I have tried one or two experiments with electricity, but they proved barren, and need not be detailed.

Referring again to your Quekett Club communication of 27th February, I would ask you if Dr. Bancroft has published his observations on the dog louse as intermediary host of *Filaria immitis*? Unless he has observed metamorphosis of the embryo in the louse's stomach it is premature to conclude that this is the intermediary host. Did the louse play the rôle he assigns to it, then we might expect to find *Filaria immitis* in the dog in all countries where the louse is found. The intermediary host is, I fancy, the principal element in determining the geographical spread of such parasites. A little reflection soon convinces one of this.

Before concluding this letter I would suggest that Dr. Somerville's statements about the habits of the Chinese with regard to the use of drinking water should not be received until he or some one else has given us the details of the investigations that have led him to the conclusion that the Chinese do not drink uncooked water. I have been many years in China and mix a good deal with the people, and the outcome of my experience is that, like other people, the Chinese drink water when they are thirsty and can get nothing better. It is quite true that with a certain class of Chinese there is prejudice against drinking cold water, but it is only the richer classes who can afford to act on such prejudices. I asked a Chinese friend, "Do your countrymen often drink cold water—the farm servants and coolies?" "Certainly," he said, "all drink water if thirsty on the hillside or in the fields; what else can they get to drink?" Only a day or two after reading Dr. Somerville's letter I asked 10 consecutive patients as they passed through the hospital consulting room about their drinking habits, and these are the answers to my question, "Do you drink cold water?"

1. Case of elephant leg (a paperhanger): Before my disease began I drank cold water daily, especially during the hot weather.

2. Case of bruise (a boatman): When thirsty I always drink cold water.

3. Case of leprosy (a boatman): When younger, and before falling ill, i. e., till I was twelve or thirteen years old, drank cold water in hot weather. Since my leprosy commenced never drink cold water; always tea.

4. Case of fibro-sarcoma (farm laborer): I generally drink cold water; sometimes tea.
5. Case of bruised and lacerated lip (idol-paper maker): I generally drink tea; once in 10 times drink water; when young I always drank water.
6. Case of scabies (a comb-maker): Seldom drink; when very thirsty generally drink water; sometimes tea.
7. Case of flat feet (a blacksmith): Generally drink tea; very rarely water.
8. Case of leprosy, (peddler): When young I drank water daily; now generally drink tea; water seldom.
9. Case of dyspepsia (peddler): When young drank water; since becoming dyspeptic never take fluids.
10. Case of bruise (shopkeeper): I generally drink tea or rice-water; sometimes drink water.

There happened to be nine lads, assistants and dressers, in the room when I interrogated these patients. Turning to them I asked them individually if they drank water; one and all confessed to being guilty of the habit, and seemed very much astonished that anyone should doubt it.

Foreigners are not so partial to water-drinking as are the natives; at least when water is drunk it is usually qualified with wine or spirits, and aerated waters of different kinds are in general use. The most careless foreigner and the total abstainers seldom drink unfiltered water; and if filtration cannot exclude an animal at least the thirtieth of an inch in length, the passing of water through a filtering apparatus must be regarded as a meaningless ceremony.

It is to be regretted that Dr. Somerville has not been more explicit as to the number of natives whose blood he has examined for filaria. Dr. Rennie, of Foochow, writes me he frequently sees the parasite in his hospital cases. Readers of Lewis's earlier papers will remember the warning he gave, foreseeing such criticisms as Dr. Somerville's. He says, referring to accounts of chyluria cases, "such remarks as this will be frequently recorded, 'Filaria searched for but not found,' or words to that effect.

If the examination of filarious blood is made during the night it is almost as easy to find the parasite as it is to find a white blood corpuscle. Seeing this, and the frequency with which the presence of the parasite is associated with lymphatic fever, elephantoid, and other disabling affections, I have sometimes thought it would be worth the trouble for the Government in India to institute the systematic examination of the blood of native recruits by their medical officers. I am satisfied that by the rejection of filarious subjects much invaliding and expense might be avoided, and that, too, at very little trouble. At any rate, much useful information might be got together, and such an idea might be profitably ventilated by Sir Joseph Fayer or some other Indian authority.

NOTES ON FILARIA DISEASE.

By PATRICK MANSON, M. D.

[From the Medical Reports, No. 23, of the inspector-general of customs, China, transmitted by Col. John S. Mosby, consul-general at Hong-Kong.

Since my last report on the subject of filaria disease was written, I have availed myself of opportunities as they have presented themselves from time to time to extend previous observations, and to elaborate or confirm what others or myself have already recorded. The results of most of this work I have brought together in the following notes. As my object has been merely to fill in gaps in our knowledge, and not to attempt a complete history, I have avoided, as much as possible, repetition of what has already appeared in these reports or elsewhere. Thus my notes may seem disconnected and be unintelligible to the reader who is not already acquainted with what has been done. Such an one I would refer for fuller information to the writings of Lewis, Cobbold, and others, and to former numbers of the Medical Reports. Many of the observations are published now for the first time; others, again, have appeared in a different form in various home journals. I thought it advisable, however, as I may not have an opportunity for some time of continuing this work, to give others the benefit of what I have stumbled on, and to bring, incomplete though many of the observations may be, these reports, as far as my own work is concerned, up to date. The subject is a new and an expanding one, and therefore fresh information, no matter how crude and imperfect, may prove useful and suggestive.

FILARIAL PERIODICITY.

In a former issue of these reports I pointed out that singular phenomenon in the history of filaria sanguinis hominis which has come to receive the name of *filarial periodicity*. I therein gave part of the evidence on which my assertion of the existence

of such a phenomenon was founded; and I ventured to make some suggestions as to its meaning in relation to the life-history of the parasite, and as to what becomes of the animal during its temporary absence from the general circulation. Although the evidence was somewhat fragmentary, yet, taken in connection with a multitude of unsystematic and unrecorded observations, it appeared quite conclusive, at least to my mind. However, in order further to elucidate the subject, and render the evidence still more complete, I determined to avail myself of the first suitable opportunity to prosecute systematic observations extending over a period much longer than that of any of the cases recorded in my previous report; and, seeing that the periodicity is one of twenty-four hours, I thought it possible that it might in some way be influenced, or even caused, by the more or less regular diurnal fluctuations in meteorological conditions dependent on the daily revolution of the earth; or, possibly, that the normal daily rise and fall of body temperature, or other quotidian physiological phenomenon, might have some association with it. I determined, therefore, to add to my observation on the ingress and egress of the embryo parasites others on the temperature and pressure of the atmosphere, the temperature of the body, and the rapidity of the circulation, as indicated by the state of the pulse.

I was able during the summer of 1880 to enlist the services of two sufficiently intelligent lads, in every way well suited for my purpose. I trained them to examine the blood, to count the embryo parasites they found therein, to read the thermometers and barometer, and to record all their observations accurately. As they themselves were filarious, and the subject of their own observations, the work could be prosecuted easily, with little fear of interruption, and with the sympathies of the observers entirely on the side of accuracy and truth. Their work I constantly superintended and checked. If error has crept into the chart* into which I have condensed their observations, I am certain it is of a trifling and unimportant character, such as is necessarily inseparable from work of the kind; taken as a whole, it may be thoroughly relied on.

Both lads came from Hooihoah, a highly filarious district, about three days' journey to the north of Amoy. Li Kha (I in the chart) was twenty-one years of age, of average size, and in good general health. He gave no history of fever, lymphangitis, or of any serious disease whatever, and his body appeared to be free from blemish that might be associated with the presence of filariæ. Tiong Seng (II in the chart), on the contrary, gave a history that distinctly pointed to filarial infection. He, too, was twenty-one years of age and in good general condition, but he stated that for six or seven years he had been subject to attacks of what he called ague (lymphatic fever), and that these attacks recurred about once a month. They began, he said, with a feeling of giddiness and painful aching-weariness in the body and limbs. This gradually merged into a cold stage of two or three hours' duration, which was succeeded by a hot stage of very high fever, lasting for twenty-four hours, terminating in a moderate diaphoresis, continuing for an hour or two. The fever was accompanied by complete anorexia, and during its continuance the inguinal and femoral glands invariably became swollen and excessively painful, those on the right side being more affected than those on the left. With the exception of these attacks and an orchitis which developed while under observation, and to be presently alluded to, he never had any trouble about the limbs or genitals, nor other symptom of filarial disease.

The observations by and on these two men I condensed and arranged in the chart previously published. In explanation of it I may mention that the first three compartments, counting from above downwards, refer to Li Kha (I), the second three to Tiong Seng (II), and that the two lowest are occupied by readings of the barometer and ordinary thermometer. At the left-hand margin are numbers referring to the filariæ found in a droplet of blood obtained by pricking the finger, and sufficient to occupy in a thin transparent film a slide measuring $1'' \times 1\frac{1}{4}''$; also the degrees of temperature of the body, beats of the pulse per minute, temperature of the atmosphere, and barometric pressure. Along the top the figures refer to the date and hour of the day at which the examinations were made.

This chart, recording as it does a long series of systematic and carefully made observations, establishes thoroughly my first assertions about filarial periodicity. A glance at it shows with what regularity every evening the embryos enter the general circulation, how they increase in number up to midnight, and how, as morning approaches, they gradually diminish until they completely disappear. Rarely can one be found from 9 a. m. until 6 p. m., at least under ordinary circumstances. Since these observations were made I have had the satisfaction of seeing them confirmed by several observers, notably by Dr. Myers in Formosa,† and by Dr. Stephen Mackenzie in London.‡ Drs. Rennie and Adams, of Foochow, I understand, can also confirm my statements, and I doubt not that by this time filarial periodicity has been amply demonstrated by other observers in the different countries in which the parasite is endemic.

It is a remarkable phenomenon, and now that its existence is so well established I

* This chart was published in Customs Medical Reports, xxii, 64.

† Customs Medical Report, xxi, 7.

‡ Lancet 1881, ii, 308, 707.

would commend it to the physiologist as a possible aid to the explanation of such rhythmical phenomena as sleep, the evening rise of body temperature, &c.; to the pathologist as a possible aid towards the explanation of diurnal intermission and remission in fevers, especially of the ague class. Whether it may or may not be of service in either of these directions it is impossible as yet to say. But though it may lead to nothing in this way, yet the thing itself is so curious and of so striking a character that the mind naturally desires more information about it, and, if possible, an explanation of its object and of its cause.

I have already pointed out* that filarial periodicity is an adaptation of the habits of the filaria to those of the mosquito, the intermediary host indispensable to the future life of the parasite. This is the object of the arrangement, but the particular force or mechanism that operates on the embryo parasite, causing it to appear in the blood normally only at certain hours—this, the cause of filarial periodicity, has yet to be ascertained. Certain facts, however, have recently been discovered that tend to confine the search to a comparatively limited field.

From the fact that the periodicity is one of twenty-four hours, we are justified in inferring that its remote cause is the diurnal revolution of the earth. As affecting the parasite in the human body, this may operate in one of two ways: 1st, by means of some of the daily and rhythmical variations it produces in meteorological forces—one or other of these being the direct determining influence that liberates or restrains the parasite; or, 2d, by inducing in the host of the parasite certain quotidian and rhythmical habits on which, directly or indirectly, the movements of the hæmatozoon depend—such as the habits of waking and sleeping, exercise, the evening rise of body temperature, the times of feeding, &c. With regard to the first of these, there are at least four principal meteorological phenomena which have a more or less quotidian and rhythmical character, and which one might conceive had an influence in some way on these parasite. These phenomena are—the rise of atmospheric temperature during the day and fall during the night; the decrease of atmospheric pressure during the afternoon; the coming and going of the light; and the diurnal variations in the electrical condition of the earth, as indicated by the magnetic needle. But if we inquire into the behavior of any of these, we shall find that no one of them is so absolutely true in its rhythm as is filarial periodicity. There are frequent exceptions to the general rules that the day is warmer than the night, and that barometric pressure falls during the afternoon. If either of these things, therefore, had anything to do with filarial periodicity, then we should expect to find the latter in entire sympathy with one or other of them, and exhibiting corresponding variations. But if the chart in which these are carefully noted is consulted, it can be seen at a glance how far this is from being the case. The presumption is, therefore, that filarial periodicity is independent of atmospheric pressure and temperature.

To ascertain if the waxing and waning of the light had any influence, I had a filarious subject, in whom I had previously ascertained that periodicity was normal, shut up for several days in a dark room, into which it was impossible for a single ray of sunlight to penetrate. During four days, as far as sunlight was concerned, he was always in the dark, and it was only after sunset that he left his room. A glance at the following table shows that the result of this experiment was entirely negative. I may remark that I was careful not to interfere with his usual habits, and therefore did not disturb him during the night to examine his blood. It was sufficient for my purpose to ascertain approximately the hours of ingress and egress of the embryos, and their conduct during the day.

Table showing the number of embryo filariæ, at the hours and dates indicated, in a slide of blood 1" × 1½", the subject of observation being kept in a dark room during the four days, 26th, 27th, 28th, and 29th November.

Date.	Hour.				
	7 a. m.	11 a. m.	4 p. m.	7 p. m.	9 p. m.
November 24.....	1	0	0	5	10
25.....	4	0	0	0	8
26†.....	13	1	1	0	5
27†.....	39	0	0	0	18
28†.....	25	1	2	1	10
29†.....	19	0	0	0	7
30.....	17	1	3	5	17
31.....	16	0	1	1	18
December 1.....	12	0	2	4	27
2.....	14	9	0	0	16

* Customs Medical Reports, xviii, 89.

† In dark room.

Thus of the meteorological influences which might be supposed to have an influence on filarial periodicity, three are eliminated. It has been shown that neither temperature, atmospheric pressure, nor light has anything to do with it. There remains only terrestrial magnetism; but although the rhythm of its variations corresponds very closely with that of filarial periodicity, the progress of discovery within the last few months has rendered a connection between the two so extremely improbable that I have not considered it worth while to pursue investigation in this direction any longer. It has been pretty conclusively demonstrated that the immediate cause of filarial periodicity is dependent, not on meteorological conditions resulting from the daily revolution of the earth, but on the habits this great fact impresses on the human body.

In the *Lancet* of 27th August, 1881, there appeared a letter from Dr. Stephen Mackenzie, in which he announced that a case of chyluria of Indian origin had turned up at the London Hospital, and that the filaria sanguinis hominis could be found in abundance in the patient's blood; and, further, that the same periodicity was observed by the parasites in London as had been described as occurring in China. At the meeting of the Pathological Society on the 18th October, Dr. Mackenzie exhibited his patient and demonstrated the parasites in his blood, and he also described how he had been able to break up, and even invert periodicity, by simply changing the habits of the patient with regard to the times of sleeping and waking. If the patient slept during the day and kept awake during the night, periodicity was inverted. This was a new and important fact. It seemed to be another step towards the explanation of a curious phenomenon, and, impressed by its importance, I took an early opportunity to repeat and vary Dr. Mackenzie's experiments.

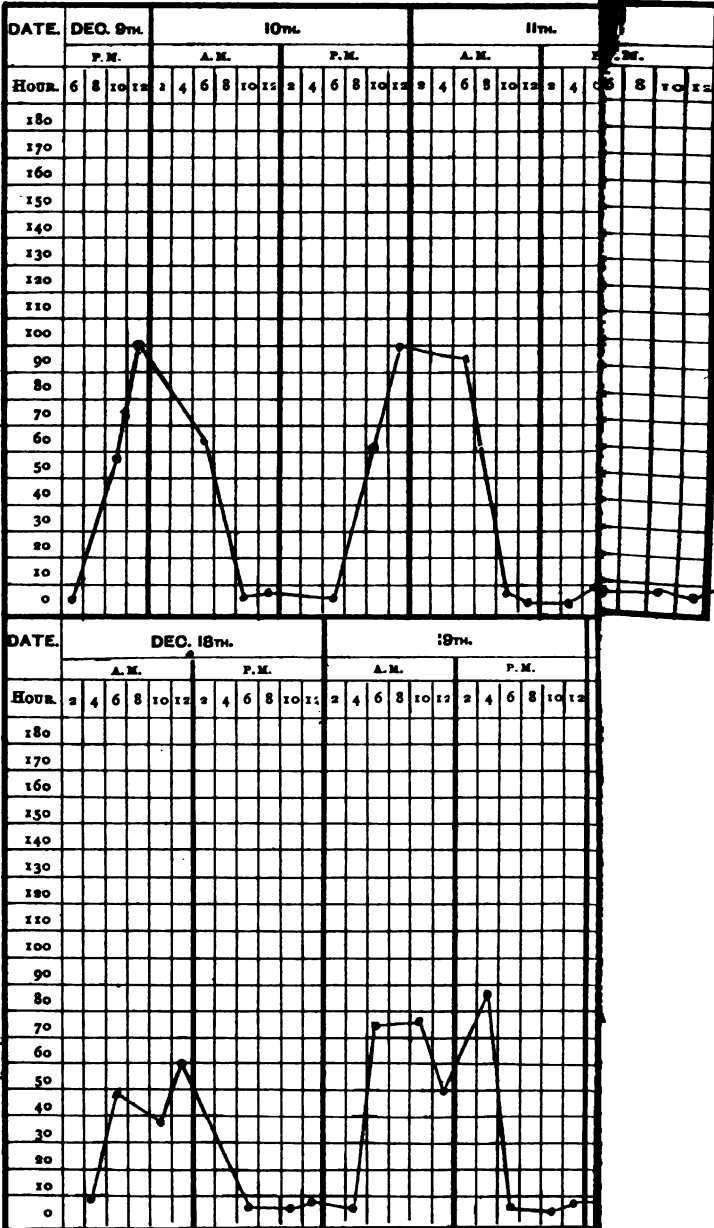
The history of the first patient on whom I experimented is briefly as follows:

CASE 58.—*Filaria in the blood; enlarged spleen; anæmia; experiment on inversion of filarial periodicity.*—Tin, male, æt. twenty-five; Tsongkhæ, Tchangtchiu; a field laborer. When twelve or thirteen years old he says he had an abscess in his lungs which burst, the contents escaping by his mouth. He spat over a bowlful of blood and pus at the outset, and continued afterwards for about four months to cough up similar stuff. He says the matter expectorated was thick, viscid, and could be drawn out in a long string; the discharge of this was difficult, attended with much cough; says he recollects this very well, as his mother used to slap his back to encourage expectoration. Now he has no trouble about his lungs beyond a slight cough when he catches cold. At fifteen or sixteen had for four months an eczema on both legs, and at seventeen a very large abscess in the right popliteal space. Since boyhood has been subject every autumn to aguish attacks of a very irregular character, lasting, off and on, for about a month every year. Often during these attacks the inguinal glands, sometimes on the right side, sometimes on the left side, inflame, but neither pain nor swelling is ever considerable. Occasionally his right testicle enlarges without inflammation. These attacks of fever consist of about one hour of rigor, followed by three hours of heat and one hour of sweating; often they are distinctly tertian, but I think they are genuine ague. The swelling of the gland does not always accompany the fever, but the lymphangitis is usually associated with fever. He states that some years ago I removed big scrota from two men living in his village, but he does not know of any well-marked case of elephantiasis of the leg among his neighbors. When young he often drank cold water, but since he became sick he never touches it. He is very thin, anæmic, and debilitated. An enlarged spleen extends beyond the border of the ribs. He has no decided enlargement of glands, scrotum, or legs, nor does he give any history of chyluria. This year his ague began about two months ago. It was certain in type and continued on him in a subdued form for about a month. He came to hospital to be treated for his debility—enlarged spleen and dyspepsia. He took quinine and Bland's pills for a fortnight, and when his health had improved considerably I got his consent to experiment on his blood parasites.

From the 9th to the 26th December, 1881, observations were regularly made on this man, the usual quantity of blood ($1'' \times 1\frac{1}{4}''$ cover glass) being examined each time. During the first five days sleep was indulged in at the usual hours. Periodicity having been found normal, the time of sleep was changed to the day, and of waking to the night. On the 14th December he was not allowed to sleep as usual, but was kept awake till 6 in the morning of the 15th—that is, for twenty-four hours. He was then allowed to sleep till afternoon; and from this time sleep was always indulged in during the day, while at night he was kept awake. Simultaneously with observations on the number of filariæ present in a given quantity of blood, observations on the body temperature were made, in order to avoid the complicating effect of fever should this occur; but as the temperature kept normal all the time I have not considered it necessary to introduce its record into the chart (table on page 183) on which I have condensed my observations. In explanation, I may mention that the figures at the side refer to the number of filariæ in a slide of blood $1'' \times 1\frac{1}{4}''$, while the figures along the top refer to the date and hour of examination. For the first five days the sleeping hours were from 6 p. m. to 6 a. m. On the subsequent days—that is, from the 15th to



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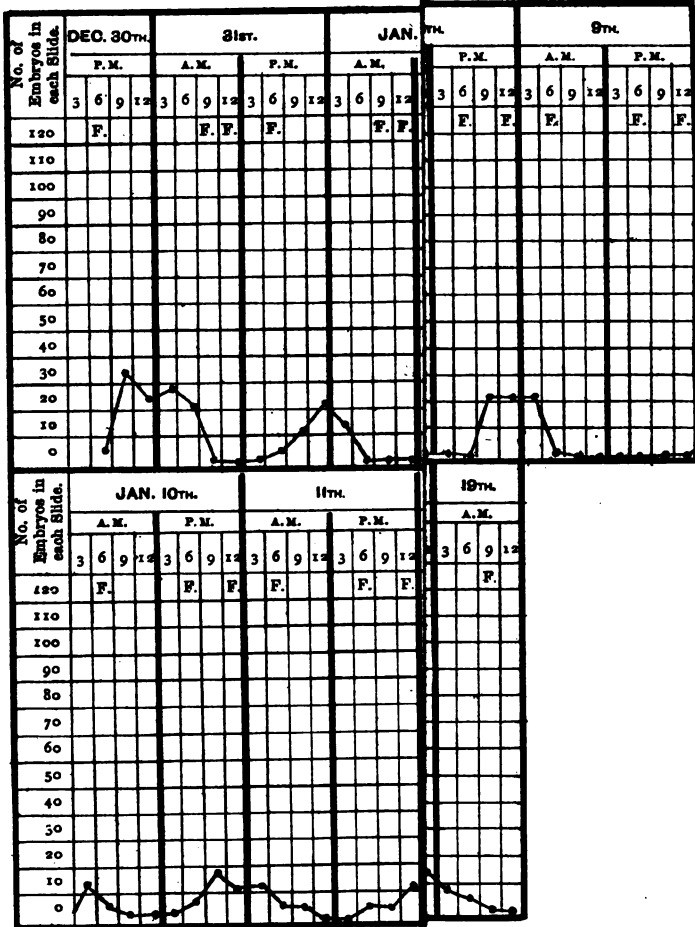
H. EX. 143, 1, 48.



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H. EX. 43, 1, 48.

the 24th December—they were from 5 a. m. to 5 p. m. During the period when the patient slept at night I did not consider it necessary to wake him at midnight to sample his blood, so in the chart I have assumed that at this hour on these days the filariae numbered 100. With this exception, only carefully observed facts are recorded.

It is evident from this chart that Dr. Mackenzie's case was not exceptional; it confirms his statement as to the connection of the sleeping and waking states with filarial periodicity. Something bound up with these states has clearly a powerful influence on the parasite or its young. But, as Dr. Mortimer Granville points out,* it is not simply sleep or waking that has this influence. It is something recurring every 24 hours, just as the habits of sleeping and waking recur, and which is capable of being inverted just as these habits are, and by the same means. That sleep does not cause the ingress of embryos is evident from the circumstance that ingress commences hours before the usual time for sleeping, and egress begins hours before the usual time of waking, and periodicity is maintained even though no sleep be indulged in for two or three days, or if sleep is continuous, or nearly so, for as long a time. (See charts II and III.) The facts of the case seem to indicate that the conditions favorable to the ingress of the parasites become developed ordinarily during the last few hours of the waking state, and that they are slowly eliminated during the last few hours of sleep.

Being anxious to vary Dr. Mackenzie's experiment, and, if possible, obtain additional facts that might aid in answering the question of the cause of the filarial periodicity, I placed two other men under observation, and variously altered and modified their hours of sleeping, waking, and eating. Unfortunately the man Tin, who was the subject of the observations recorded in Chart I, had had enough of it, and seemed very reluctant to submit to a second course of experiment. I was therefore obliged to fall back on the two other men, whose stock of filariae was rather too limited to show distinctly delicacies of fluctuation. I give the results for what they are worth. Charts II and III are arranged on the same plan as Chart I. The letter "F" is introduced at the hours when food was taken.

In the case of Tiek Po (Chart II), the patient slept from 9 p. m. on the 30th December to 6 a. m. on the 31st. From 9 a. m. on the 31st December to 6 a. m. on the 3d January, and from 3 p. m. on that day to 3 p. m. on the 5th, sleep was prolonged by repeated doses of chloral, the patient being waked up to take food at the usual hours. From the 5th to the 8th January the sleeping hours were from 9 p. m. to 6 a. m. Thence until the 20th sleep was allowed each day from 8 a. m. to noon, and from 8 p. m. to midnight. On the 20th–21st the patient slept from 8 p. m. to 6 a. m., and on the subsequent nights from 9 p. m. to 6 a. m.

In the case of In (Chart III), sleep was permitted from 9 p. m. on the 30th December to 6 a. m. on the 31st. The waking state was enforced from this latter hour until 9 p. m. on the 2d January. Thence to the 18th January sleep was enjoyed nightly from 9 p. m. to 6 a. m., and from 9 p. m. on the 18th to noon on the 19th.

The history of the men is briefly as follows:

CASE 59.—Tiek Po (Chart II), male, aet. twenty-five; Tchauoi, Tchiupo; farmer. He lives in a village of about 150 inhabitants, and among these are several cases of elephantiasis. Has been ailing for four or five years with ague of tertian type. Off and on has had attacks every winter with the advent of the cold weather. His spleen has been enlarged for several years, and since a year ago he has been subject to attacks of pain and swelling in the left testicle and cord. On examination his spleen is found to extend to the umbilicus, but no swelling of cord, testicles, scrotum, glands, nor legs can be made out; nor is there any history of chyluria or lymphatic fever. Two months ago he had a single fit of fever, and is now very anæmic. During the time he was under observation he was given quinine and iron in full doses.

CASE 60.—In (Chart III), male, aet. forty-seven; Danmng, Tchiupo; farmer. In his village of 200 inhabitants are several cases of elephantiasis of leg or scrotum. One of the latter was operated on at the hospital some time ago. Since boyhood has been subject nearly every year to lymphatic fever of three or four days' duration, associated with swelling of the testicles and scrotum. He has also had attacks of tertian ague and swollen spleen; but at present both spleen and scrotum are normal to all appearance, although the groin glands are rather large and firm. He says that during his fever attacks these glands swell to the size of fowls' eggs. Had, on admission, right facial paralysis of forty days' standing; this supervened during an attack of fever and delirium. Has never had chyluria nor distinct sign of elephantiasis. His reason for coming to hospital was to be cured of a long-standing chronic ulcer on the left leg. He, too, while under observation, took full doses of iron and quinine.

From these charts we may gather that filarial periodicity is maintained during prolonged watching, and also when the hours of eating are changed, so that the middle meal is taken at midnight, and not, as usual, at midday; also, that prolonged sleep possibly disturbs periodicity and diminishes the number of parasites circulating at the time of maximum; and, that when the usual allowance of eight hours' sleep is taken

* Lancet, 1882, i, 314.

in spells of four hours at a time, at intervals of eight hours, periodicity is disturbed, and the numbers circulating at the time of maximum are sensibly diminished.

When experiments and facts have been multiplied, we may be able to say precisely what is the cause of filarial periodicity. At present, facts are wanting. One which seems to me to have some importance I have not yet alluded to. If reference be made to the chart at p. 64 of vol. xxii, it will be seen that the man Tjong Seng was, shortly after observation commenced, attacked with fever. The fever was consequent on orchitis and lymphangitis, undoubtedly of filarious origin. It will be seen that the body heat was very high a considerable time before periodicity was affected, and that the usual rhythm of the ingress and egress of the parasites was not renewed for some days after the temperature had fallen to normal. It would seem that the febrile condition slowly developed in the blood, or elsewhere, some constituent or condition whose presence or amount influenced the parasites, and that it was not until this pathological product or condition was eliminated or altered that periodicity of a normal character was resumed. May not the waking state, which seems so favorable to the ingress of the parasites, be associated with the development of some physiological condition or product analogous to, or the same as, that resulting in pathological quantity from fever, and the presence of which leads to the presence of the embryo parasites in the blood?

Dr. Mackenzie's discovery has done something to advance this interesting inquiry. He has limited the field in which search need be made. Nevertheless, much has yet to be done—more facts to be collected—before the answer can be given. It seems to me that this will have to be supplied by the physiologist; and when the answer has been supplied, we shall be in possession of an explanation of many phenomena more important, though not more curious, than filarial periodicity.

FATE OF THE EMBRYO PARASITES NOT REMOVED FROM THE BLOOD.

Another point on which I have a few remarks and facts to offer has recently been discussed by Dr. Myers in a valuable paper in the twenty-first volume of these reports, viz, the fate of the embryo parasites which have not been directly removed from the blood by mosquitos or other means. Do they, after a brief life of a few hours, die, and have we to deal with a fresh swarm every twenty-four hours? Or do the parasites, after a temporary appearance in the general circulation, daily retire to some organ or set of vessels to await the recurrence of conditions such as I have been discussing, which induce them again to circulate? Dr. Myers alleges that when the blood is examined towards morning, when the numbers are diminishing, symptoms of languor are observable in many specimens, and if these languid individuals are watched for some days they are found to disintegrate more rapidly than other and more vigorous specimens obtained during the earlier part of the night. Dr. Myers's experiments I repeated many times, but failed to satisfy myself that what he describes applied to the parasites I observed. I have kept both morning and evening embryos alive on oiled slides for over one hundred hours. In fact, so long as the serum of the blood remained fluid or viscid, so long did the parasites live. I do not think it reasonable to suppose that animalcules exhibiting such tenacity of life outside the body should so quickly die in it, seeing that the circulating blood is their natural habitat. But, even supposing that what Dr. Myers describes is to be found in every case, it does not by any means follow that this condition of languor is preliminary to disintegration; quite as probably it is preliminary to their passing into some state of rest. If they died daily in the blood, surely dead specimens would be frequently met with; yet so far is this from being the case that I do not recollect ever to have seen in freshly-drawn blood a dead filaria—at least, one whose death could not easily be accounted for by crushing under the cover glass. The facts Dr. Myers adduces are hardly sufficient to found an argument on. In a former paper* I quoted some experiments on the destiny of the embryos of *filaria immitis* of the dog. Their preponderating abundance in the lungs at certain times seemed to favor the supposition that they occasionally retired to the pulmonary circulation, and I suggested that something analogous might happen in the case of *filaria sanguinis hominis*. I quite agree with Dr. Myers that such evidence is not conclusive, but analogy must be allowed to have some weight in inquiries of this nature. I may mention here that blood aspirated from the enlarged spleens of two filarious patients during the day contained no filariæ; and that examination of a very small quantity of lung blood in a case of hæmoptysis, also in a filarious subject, yielded similarly negative results.

If we adopt Dr. Myers's views as to the fate of the embryos, we are driven to the conclusion that filarial periodicity depends on intermittent reproduction, and that a fresh swarm issues from the parent every twenty-four hours. It is possible to put this hypothesis to the test of experiment. In two cases I have had the opportunity of doing so.

I have already† published a case of lymph scrotum in which the parent filaria was

* Customs Medical Reports, xviii, 40.

† Ibid., xx, 13.

found. Prior to operation lymph constantly dripped from ruptured lymphatics on the surface of the scrotum. As there was constant discharge, there was no accumulation. Therefore the lymph that escaped was a fair sample of what was passing the parent worm, and in which she was lying. The lymph was examined three times in one day, viz, at 11 a. m., 5 p. m., and 7 p. m. At each examination many embryos were found. It was evident that the parent was giving birth to them at a time when they are normally absent from the circulation, and that periodicity in this case was independent of the act of parturition. Did filarial periodicity depend on intermittent reproduction, then no embryos could have been found at 11 a. m., and if found at 5 p. m. they would have been present in the lymph only in very small numbers. I might have made a more extended and careful series of examinations in this case with a view to settle the point, but its importance did not occur to me at the time. Still, as far as they go, these few observations are significant.

Since Dr. MYERS informed me of his views, I have been on the outlook for a similar or equally suitable case, and some time ago succeeded in finding one which seems to me to settle the point.

CASE 61.—*Chyluria; filariæ in the blood and urine: an attempt to ascertain whether filarial periodicity be dependent on quotidian and intermittent reproduction, or whether it be altogether independent of the act of parturition.*—Ip, male, æt. twenty-four; born and residing in Hongsansia, a large village on the North River, about 8 po from Amoy; farmer. Never suffered from fever, nor, until lately, from any serious disease. Sometimes has dyspeptic pains in the belly, but nothing of a more serious character. For the past seven or eight years has been troubled with swelling of the left testicle after a hard day's work; the swelling is only slight, and is never accompanied by fever or inflammation. The chyluria, on account of which he came to hospital, appeared about sixty days before the date of his admission. It began suddenly after a long, rough, midnight hunt after a wild pig on the Hongsan Hills. On his return home he urinated clots; and since then he has constantly, with only one or two exceptions, passed chylous urine. Latterly, he says, the urine has become redder in color; formerly it was more milky. He has no elephantiasis nor disease of legs, scrotum or glands; the only thing amiss is slight swelling of the left testicle. Elephantiasis is not common in his village, but there are plenty of cases in the surrounding country. He often drinks cold water. The urine on being passed is of a dark opaque salmon color, and reddish clots swim in it. Examined with the microscope it is found to contain many active filariæ, and his blood, if searched after sunset, is seen to be similarly infested. He complains of much debility and considerable loss of flesh and strength, but his appetite is as good as ever.

As in this case lymph or chyle was nearly always present in the urine, there could be no accumulation in the lymphatics. What at any given time might be selected for examination was a fair specimen of that passing the parent worm; and the presence or absence of embryos in this would be a reliable indication of her activity or repose as regards the act of parturition. It was therefore a case well suited to settle the question whether filarial reproduction was a more or less constant or an intermittent process.

The patient was given a placebo, and directed to pass urine into a clean vessel every three hours. The urine thus obtained was well stirred, so as to break up coagula as soon as they formed. An ounce of it was then drawn off into a smaller vessel, and allowed to stand for some hours until subsidence had occurred. A little of the sediment was then taken up with a pipette, one drop of this placed on a suitable slide, and the filariæ it contained carefully counted. Blood drawn at corresponding hours was also examined, and the number of embryos in a slide 1" × 1½" enumerated. The result of these examinations, extending over one week, I have projected in the accompanying table:

Table showing the number of embryo filariæ in a fixed quantity of blood and urine, obtained at intervals of three hours, from a case of chyluria.*

	Hours.							
	3 a. m.	6 a. m.	9 a. m.	12 m.	3 p. m.	6 p. m.	9 p. m.	12 m. n.
August 13, 1881:								
Quantity of urine.....				12	½	10	8	12
Filariæ in urine.....				4	1	10	2	0
Filariæ in blood.....				0	0	0	4	1
August 14, 1881:								
Quantity of urine.....	W 1½	1	5	5½	10	W 15	11	W 8
Filariæ in urine.....	0	4	0	9½	1	0	1	0
Filariæ in blood.....	0	0	0	0	0	1	6	8

* W before the amount of urine indicates that it was watery and comparatively free from chyle or lymph. The quantity of urine is expressed in ounces.

Table showing the number of embryo filariæ in a fixed quantity of blood, &c.—Continued.

	Hours.							
	3 a.m.	6 a.m.	9 a.m.	12 m.	3 p.m.	6 p.m.	9 p.m.	12 md. n.
August 15, 1881:								
Quantity of urine.....	W 4	2½	½	6	10	17	16½	6
Filarie in urine.....	2	3	8	17	2	0	11	0
Filarie in blood.....	2	0	0	0	0	0	12	14
August 16, 1881:								
Quantity of urine.....	5½	W 2½	½	17½	20	W 22	18½	13
Filarie in urine.....	1	0	2	6	3	0	2	1
Filarie in blood.....	3	0	0	0	0	0	17	11
August 17, 1881:								
Quantity of urine.....	W 2½	W 2	1	6	18	15	6	5
Filarie in urine.....	1	0	2	6	6	2	11	2
Filarie in blood.....	2	0	0	0	0	0	9	7
August 18, 1881:								
Quantity of urine.....	W 8	W 2	3	W 8	16½	11	18½	12
Filarie in urine.....	0	0	1	1	11	14	1	0
Filarie in blood.....	1	0	0	0	0	0	14	9
August 19, 1881:								
Quantity of urine.....	3½	4½	1	-----	-----	-----	-----	-----
Filarie in urine.....	0	0	23	-----	-----	-----	-----	-----
Filarie in blood.....	2	0	0	-----	-----	-----	-----	-----

If these figures are added together and arranged as follows, the results of this examination become more apparent. It seems to me that they indicate that filariæ embryos are nearly constantly passed into the lymph stream; and that whenever lymph finds its way into the urine, no matter at what hour, nor how long it has been running, it contains the parasite. Therefore, filarial periodicity is independent of the act of parturition, which is more or less a continuous process.

Précis of foregoing table.

	Hours.							
	3 a.m.	6 a.m.	9 a.m.	12 m.	3 p.m.	6 p.m.	9 p.m.	12 md. n.
Total quantity of urine in ounces.	25	14½	11	55	75	90	78½	56
Total filariæ in a slide of urine ..	4	7	36	43	24	26	28	3
Total filariæ in a slide of blood ..	10	0	0	0	0	1	62	50
Average quantity of urine.....	4½	2½	1½	9½	12½	15	13	9½
Average filariæ in a slide of urine ..	1½	1½	6	7½	4	4½	4½	8½
Average filariæ in a slide of blood ..	1½	0	0	0	0	0	10½	8½
Number of times urine watery ..	4	3	0	1	0	2	0	1

Although not bearing specially on the subject under discussion, the history of the case after this series of observations was completed is of interest as showing how much mechanical influences have to do in setting up and maintaining elephantoid diseases.

The observations recorded in these tables were completed on the 19th of August. On the 20th I sent him to bed and confined him strictly to the recumbent position. Very shortly this had the effect of making the urine in most specimens perfectly limpid. By the end of a week it was permanently clear. He then went home. Six months afterwards I heard of him. He was then quite well, and said he had not passed chylous urine since he left the hospital.

The chyluria was caused in the first instance by the succession of rough exercise rupturing a congested and dilated lymphatic in the urinary tract; rest, and the removal of lymph pressure, obtained by maintaining the recumbent position, allowed the rupture to heal. The chyluria was thus cured, at least, temporarily, and one element in the pathology of these diseases clearly indicated. Chyluria, lymph scrotum, elephantiasis, diseases caused by lymphatic congestion and varicosity should be treated on exactly the same principles as diseases resulting from mechanical blood congestion or venous varicosity. The most important element in the treatment of both forms of congestion is the removal, as far as possible, of fluid pressure by rest and elevation of the affected part.

THE INTIMATE PATHOLOGY OF FILARIA DISEASE.

There is abundant evidence that *filaria sanguinis hominis* does not always, or even generally, give rise to disease. As a rule, parasite and host live together for years in perfect harmony. Nature has adapted the requirements of the former to the organization of the latter. But the evidence is equally strong that at times this harmony is disturbed, and that the presence of the parasite entails grave disease to its host, and that this disease is sometimes in one organ, sometimes in another. These are circumstances which demand an explanation. Why should the parasite give rise to disease in one man and not in another; and why should one organ suffer in one subject, another organ in a second, another in a third, and so on?

The explanation I propose to supply. I have some diffidence in bringing it forward, for it is of so strange a character, and unlike anything in pathology, that I fear many will disbelieve my facts and ridicule my conclusions. Nevertheless, the facts are correct; and this being the case, I do not see how the conclusions I deduce from them can be avoided. Many years may elapse before my observations are confirmed, for hundreds of cases may have to be examined before one similar to those I will refer to is encountered; and even when this has been met with and described, I barely hope that, unless it is vouched for by some very eminent authority, it will carry conviction to all minds. The facts of parasiticism are as strange as they are important, and just in proportion to this is the difficulty in getting them believed.

Some time ago* I gave the particulars of a case of lymphatic edema of the legs, associated with slight enlargement of the groin glands. I described how I punctured the glands with a hypodermic syringe, and how I found in lymph thus obtained not only the usual form of embryo *filaria sanguinis hominis*, as seen in the lymph and blood, but *ova* of the parasite containing active and perfect embryos. This for a long time remained an isolated and, by me, misinterpreted fact. To account for the presence of the *ova* I supposed that the parent *filaria* was normally oviparous, and some ambiguity in Lewis's description of the worm gave ground for this. But afterwards I had the good fortune to find two specimens of the mature worm for myself. An examination of these convinced me that they were certainly viviparous, and that my former hypothesis was therefore incorrect. How, then, seeing that the animal was not oviparous, was I to account for the presence of the *ova* in the case I refer to? I searched the gland lymph of dozens of cases, and also the lymph from many lymph scrota, and several cases of chyluria; but in vain. I could not meet with *ova* a second time. I began, therefore to think, improbable though the supposition seemed, that the hypodermic needle I used to extract the lymph had wounded the uterus of the parent worm, and thus allowed the *ova* to escape. But in the spring of last year a second case turned up in which *ova* were found, and under circumstances in which it was impossible to suppose their presence was owing to injury of the parent. The following are my notes of the case:

CASE 62.—*Lymph scrotum; filaria in lymph from scrotum, also ova containing coiled-up and active embryos; small number of parasites in the blood: Operation.*—Tui, male, *æt.* fifty; Tchangtchin, Khioatan, a farmer. There are some 200 to 300 inhabitants in his village, including several cases of elephantiasis. One, called Benga, I operated on some years ago, removing a 12-pound scrotum.

When young was careless about the water he drank, taking it indiscriminately from pool, well, or river. When a little over ten years of age had frequent attacks of ague, both quotidian and tertian. His scrotal trouble began at eighteen. He had hydrocele then, and at times inflammation of the scrotum, and lymphous discharges. Two years ago, he says, I tapped his hydrocele. I forget the circumstance, and the character of the fluid withdrawn. As I did not inject iodine, doubtless at the time I considered the hydrocele to be of filarious origin, although he says the fluid removed was clear and straw-colored. The hydrocele did not return, but the scrotum enlarged. He has attacks of fever and enlargement of the groin glands; and, irregularly, some three to ten times a month, the scrotum discharges a clear fluid, very like urine in appearance.

May 18, 1881.—The scrotum is as large as a pumelo, and the penis is buried in it; the upper and anterior part is firm, like a forming elephantiasis, while the lower and back part is covered with enormously dilated lymphatics, some of the ampullæ containing clear fluid, being as large as the tip of a finger.

7 p. m.—Pricked a vesicle; profuse discharge of fluid, in which I found *filariæ*. A slide of blood from the finger drawn at 9 p. m. contained no parasites.

May 19, 6 a. m.—Slide of finger-blood examined; no *filariæ*. Lymph drawn last night again examined; it had coagulated but feebly; it again yielded *filariæ*. The feeble coagulum was now broken up by stirring. It rapidly disappeared, a small quantity of red deposit and some white cloudy flocculi subsiding. In this sediment were many embryos, and in nearly every slide *ova*, with active embryos struggling

* Customs Medical Reports, xviii, 49.

vigorously to stretch their chorionic envelopes. No double outline could be detected in the embryos. The chorion could be distinctly made out, especially when the activity of movement had somewhat subsided.

May 20.—An assistant examined a large slide of blood drawn at 10 p. m. last night, and in it found one embryo; and again at 6 a. m. to-day, but then found none. I examined several slides of sediment from the lymph of the 18th, and found embryos still alive, many of them inclosed in an oval or nearly globular sac, and two specimens in which the chorion was half stretched. These latter embryos were still working vigorously, but had not quite completed the stretching operation, as a third of either anterior or posterior end was still doubled on the rest of the body, no room having as yet been gained for the animal to lie completely outstretched.* In this man a very few embryos still found their way into the circulation, but there certainly was no free communication between the lymphatics of the scrotum and the blood.

May 21.—Scrotum removed, skin of penis being preserved. I quite expected to find the parent worm in this case, but although the scrotum was cut up into very small pieces and carefully searched, no trace of the animal was observed. The tissues were much more dense than is usual in lymph scrotum, and their bulk was considerably greater than obtains in the generality of these cases. In fact it appeared, but for the vesicles and discharge, more like an ordinary case of elephantiasis. No lymph could be made to regurgitate by pressure on the groin glands.

June 10.—Case doing well. Since the operation the blood was frequently examined and at suitable times, but no filariæ were found in it.

Here, then, are two cases in which the ova of the parasite were found in the lymphatics. It is evident that my first case was not exceptional. Occasionally ova are passed into the lymphatics. Like other animals, therefore, the parent filaria is liable to miscarry. This, at first sight, would appear to be a matter of little importance, but reflection will show that this is by no means the case. The accident is fraught with danger, and is in fact the cause of the elephantoid diseases and the key to their intimate pathology.

In the instances in which the parent worm has been discovered she was found in lymphatic vessels on the distal side of the glands. This has been shown to be in many, if not in all, cases her normal habitat. Her progeny, therefore, must travel along the afferent vessels, through the glands, and so on to the thoracic duct and thence into the blood. The long, sinuous, and powerful body of the embryo is well adapted to perform this journey. But suppose, instead of this mature embryo, an ovum is launched into the lymph stream prematurely, and before the contained embryo has sufficiently extended its chorion, then this passive ovum must certainly be arrested at the first lymphatic gland to which it is carried by the advancing lymph current. It measures $\frac{1}{16}$ " by $\frac{1}{16}$ ", whereas the outstretched embryo is only about $\frac{1}{16}$ " in diameter. It is much too large to pass the glands, and the embryo, rolled up in its chorionic envelope, cannot aid itself. It becomes, in fact, an embolus. Now, filariæ are prodigiously prolific. Myriads of young are expelled in a very short time. I have watched the process of parturition in the minute filaria corvi torquati. Every few seconds a peristaltic contraction, beginning low down in the uterine horns and extending to the vagina, expels some 20 or 30 embryos. If this process of parturition occurs prematurely, or peristalsis is too vigorous, and extends to a point high up in the uterine horns where the embryo has not yet completely stretched its chorionic envelope, then ova are expelled. These, as they reach the glands, where the afferent lymphatic breaks up into fine capillary vessels, act as emboli, and plug up the lymph channels one after another until the fluid that carries them can no longer pass. In this way the gland or glands directly connected with the lymphatic in which the aborting female is lodged are thoroughly obstructed. Anastomoses for a time will aid the passage of lymph, but the anastomosing vessels will carry the embolic ova as well as the lymph. The corresponding glands will then, in their turn, be invaded, and so on until the entire lymphatic system connected directly or indirectly with the vessel in which the parent worm is lodged becomes obstructed.

This, I believe, is the true pathology of the elephantoid diseases: 1, parent filaria in a distal lymphatic; 2, premature expulsion of ova; 3, embolism of lymphatic glands by ova; 4, stasis of lymph; 5, regurgitation of lymph and partial compensation by anastomoses; 6, renewed or continued premature expulsion of ova; 7, further embolism of glands. This process, according to the part of the lymphatic system it occurs in, the frequency of its recurrence, and its completeness, explains every variety of elephantoid disease.

It would be tedious to apply the theory in detail. One has but to locate in imagination an aborting female filaria in the different lymphatic areas, and follow out in his mind the effect of embolism of all or part of the lymphatic circle in order to recognize the key to an entire group of diseases. If we bear in mind what must be the

* For a description of the process of chorion-stretching here alluded to, the reader is referred to the Customs Medical Reports, xiii, 81, and xiv, 11.



FRAGMENT OF FEMALE FILARIA SANGUINIS HOMINIS FROM ABSCESS IN THIGH, SHOWING REMAINS
OF ALIMENTARY CANAL, DECOMPOSING BODY, DEAD EMBRYOS ESCAPED
FROM RUPTURED UTERUS; ONE OVUM VISIBLE.

H. EX. 43, 1, 48.

effect of injury, gravitation, diathesis, and so on, on the areas of lymphatic congestion, and do not overlook the circumstance that the lymphatics of one side of the body anastomose with those of the other, there is no fact or variety of filaria disease which this theory does not fully explain.

It may be objected that I have assumed too much in supposing that the parent worm is liable to miscarry. But I have sufficient evidence in the two cases I have narrated that it has occurred; and if it has happened twice in a limited number of cases, it certainly happens not unfrequently. Perhaps I have examined lymph from scrotum, glands, or urine in 200 cases, yet in this limited number of observations evidence of premature birth of ova was obtained twice. Therefore the thing cannot be of very rare occurrence, although to have sampled the lymph at the proper time and in a suitable case must be regarded as a fortunate circumstance not often to be encountered. I trust that the theory I have propounded will not be condemned off-hand, but that observers will patiently work out the cases they meet, examining thoroughly the sediments of lymph from scrotum, glands, or urine. If this be done by three or four conscientious workers with suitable opportunities, some one, before many years are over, will find the ova in the lymph just as I have done. With these before him, let him try to account for their presence and attempt to follow out in imagination the effect of their passage along the lymphatic vessels. I feel sure he will arrive at the conclusions I have expressed, and that he will become a convert to the parasitic theory of elephantoid disease.

ABSCESS CAUSED BY DEATH OF PARENT FILARIA.

The explanation I have given of the manner in which elephantoid disease is produced applies to most if not to all diseases, with one exception, which result from the presence of the parasite in the human body. There is one exception. *Death of the parent parasite may give rise to abscess, and the frequency with which abscess of the scrotum or thigh is met with in Chinese practice here is, in my opinion, attributable to this.* The following case was certainly of this nature:

CASE 63.—Abscess in the thigh caused by the death of the parent filaria; varicose groin glands: fragments of mature worm in the contents of abscess.

January 7, 1881.—A middle-aged, well-nourished man came to hospital to-day with a large, hard, brawny-red swelling in the upper and inner part of the right thigh. An abscess was evidently forming. I observed that the corresponding femoral glands were somewhat enlarged, softish, and not inflamed; and he said they had been swollen long before the present trouble began. He also had had fever, apparently lymphatic. Accordingly, I concluded that the glands were filarious, and that their enlargement was not secondary to the inflammation then existing. I drew off from them with a hypodermic syringe some milky lymph. In this a very imperfect and hurried search was made for embryos, but none were found. *Diagnosis:* Abscess caused by death of parent filaria in lymphatics. Pus, apparently, had not formed, so mercurial ointment was ordered to be rubbed into the swelling and poultices to be applied.

January 10.—Returned this morning in great pain; matter had formed. Free incision gave vent to about 4 ounces of dark yellow-brown pus, in which floated two or three dark clots of blood, evidently effused for some time. The pus and clots were all collected, and this evening I carefully searched them. By drawing a needle rapidly through the pus I succeeded in entangling three or four fibers, which, on being subjected to microscopical examination, proved to be fragments of a mature female filaria. In one fragment were large numbers of fully-formed outstretched embryos, all dead and granular, great bunches of them escaping from rents in the wall of the uterus; other fragments were crowded with ova at an earlier stage of development. (*See Illustration.*)

January 25.—Filariae have been found in this man's blood every night till date. To-night I found two active specimens in a slide of finger-blood drawn at 7 p. m. The wound is healing, and the surrounding induration has disappeared; but the glands, especially the femoral, are still swollen on the right side. He tells me that these glands have been big—but on this side only—for over ten years, and that once, long ago, they were inflamed. For a year or two he has had very little fever, but formerly was more subject to it.

January 28.—This afternoon pierced the enlarged femoral glands and drew off, rapidly dropping, about 2 ounces of salmon-colored lymph. (Dr. Jamieson, of Shanghai, was present.) In one slide of this lymph found a very languid and faintly granular embryo. One slide of blood drawn and examined at 6 p. m. contained one active embryo.

February 14.—Two drachms of lymph drawn from glands. A full slide of this contained twelve active filariae. One of these examined with a high power looked perfectly healthy and normal.

This man remained under observation for about two months after the abscess was opened, and therefore after the death of the parent filaria which was connected with

the enlarged femoral glands, yet during all this time his blood contained at the usual hours a fair stock of embryos—apparently as many at the end of the two months as at the beginning. It is fair to infer from this either that there were other mature female worms alive in his lymphatics, or, if the dead specimen removed from his thigh was the only one, that the young *filarie* keep alive for several months both in lymph and blood.

THE PROBABILITIES OF CHOLERA IN EUROPE.

UNITED STATES CONSULATE,
Smyrna, July 13, 1883.

SIR: The news from Egypt is less alarming than at the time of my last report. Facts have come to light tending to show that the disease which is decimating the population of Damietta is not Asiatic cholera, but a malignant local distemper caused by the filthy condition of the town and the unclean habits of its lower classes, whose principal article of food is fish caught from water polluted and poisoned by being used as a receptacle for offal, the carcasses of diseased animals, &c. During the British occupation many animals perished and their bodies were dumped into the water, regardless of consequences.

This theory is strengthened by the following facts:

The disease first made its appearance in Damietta on the 4th of June, but was not made public until the 20th, at which time the death-rate became too great for longer concealment; (2) the mortality is confined almost wholly to natives who disregard in their modes of living all sanitary requirements; (3) the disease is limited to a small territory; (4) its previous course, on the supposition that it is Asiatic cholera, cannot be traced; (5) the disease does not spread with the rapidity of Asiatic cholera. In 1865 the cholera was only two days in traveling from Damietta to Alexandria. I may add that some of the best physicians of Smyrna do not regard the present scourge in Egypt as the cholera. With the stringent measures taken to confine it within its present limits, it is fair to assume that its ravages will not be much farther extended, although the death-rate shows little diminution as yet.

I am, sir, your obedient servant,

W. E. STEVENS,
Consul.

CHAS. H. SMART, M. D.,
Secretary National Board of Health, Washington, D. C.

THE PROBABILITIES OF THE CHOLERA IN EUROPE.

Apropos to the universal interest in cholera and the means relied upon for its prevention, we present the following free translation from the *Gazette Hebdomadaire des Sciences Médicales de Bordeaux*, July 29, of a recent discourse upon the subject by M. Fauvel.

This discourse was warmly received by the members of the Academy. M. L. Guérin attempted to weaken the force of the argument and to defend England, but his intervention was ineffectual.

M. Fauvel said: Having been invited by our honorable president to present to the Academy of Medicine the results of an extended experience with epidemics in the East, I come to-day to state my conclusions in regard to the epidemic of cholera which prevails in Egypt, and the consequences that may follow from it.

I will confine myself to a brief description of the actual condition in Egypt, and to pointing out the origin of the epidemic, and then consider the chances of preserving Europe from an attack of the disease.

This invasion of cholera is not a matter of surprise to those who have kept themselves informed of the actual situation in Egypt since the English invasion. I do not hesitate, on every proper opportunity, to express the fear that all the barriers which have been raised against the importation of cholera into Europe will soon be removed. But, before undertaking this task, a few preliminary observations are necessary.

I may premise that of late years the commercial spirit of the English authorities in India has prompted them to devise a doctrine very convenient for themselves, and one that enables them to avoid the inconvenience of quarantine at Suez, for vessels leaving ports in India where cholera is endemic. This doctrine considers the places

in which cholera is endemic as dangerous only when the disease happens to exist in an epidemic form. But, as I have before shown, the real source of the disease is never the seat of an epidemic; the English authorities therefore take advantage of this principle to give, on all occasions, clean bills of health; that is, cholera is never mentioned in the bills from such ports.

I have frequently, and in the most emphatic terms, protested against this doctrine, which is disproved by the most indisputable facts.

Last year in the months of July and August, Egypt twice escaped an attack of cholera. The first time, on the arrival of English troops from India. The English Government, fearing that these soldiers would bring cholera into Egypt, took care to ignore the doctrine so convenient in commercial matters, and subjected the troops before embarking to a rigid inspection and to a most strict quarantine; and, thanks to these precautions, they did not bring cholera into Egypt. Shortly afterwards, in the month of August, a vessel carrying pilgrims left Bombay with a clean bill of health and arrived at Aden with cholera on board, and was sent to the island of Camaran, in the Red Sea, where a quarantine had been established. There an epidemic of cholera broke out among those detained in quarantine, and one of the officials of the establishment was among the victims.

During this time other vessels arriving from Bombay avoided the quarantine and went directly to Djeddah, where they were admitted; and soon cholera broke out among the pilgrims during the celebration of the Courban-Bairam. But beyond this a strict quarantine was enforced against the pilgrims, and Egypt was again saved from cholera. However, the influence of England in Egyptian affairs and the sanitary council established at Alexandria, a majority of whose members were under English influence, soon paralyzed its action.

An incident occurred in the month of April last which afforded the English authorities an opportunity to throw off the mask. During the months of April and May cholera became much more active in its ravages in Bombay, and the sanitary councils of Constantinople and of Alexandria decided that it would be necessary to quarantine those coming from Bombay. But the English authorities interfered in favor of Indo-Javanese pilgrims whom the council wished to retain in quarantine. England interfered through her delegates, and pretended that the question was not included in the regulations, that the council had not the right to declare it a matter of urgency, and that it would be necessary to appoint a special committee, which would be equivalent to postponing it indefinitely. Many members protested against this claim, and then the English delegates and their adherents left the council, so that it was without a quorum and unable to transact any further business.

These tactics were renewed several times; on the last occasion with threats from the English representative, and so effectual that in consequence of the suspension of all action by the sanitary council no precautions have been taken in regard to arrivals from India since the end of May. The Porte, informed of what was going on, adopted measures of protection against Egypt, and decided to establish measures of protection—at least in appearance. But it was too late, and cholera broke out in Damietta. For our part, when informed by M. Guillois of the condition of affairs in Alexandria, and of the consequences that were likely to follow from the conduct alluded to, steps were about to be taken to prevent the danger when we received the news of the appearance of cholera at Damietta.

It was thought for a short time that the disease was only choleraic in form, the result of local causes. Soon, however, the course as well as the character of the disease left no doubt as to its nature; it was real Asiatic cholera, with all its most dangerous features.

Still more, we have been able to trace the disease to its true source and to show that it has been imported by merchants coming from Bombay to attend the fair, which was held at that time near Damietta. It has also been shown that an English stoker quitted an English ship, which was suspected of being infected, and went to Damietta. There can be no doubt that cholera was imported into Egypt from Bombay. I leave to you to determine who has been responsible for the importation.

It is in vain, then, for the English Government, interested in representing the epidemic which broke out at Damietta as only the result of unsanitary local conditions, to send out one of the most eminent of her physicians to investigate the question. It was in vain that he pronounced it a case of endemic disease, and one that would not extend beyond the locality in which it originated. The course of the epidemic soon proved his assertions rash and incorrect; so true is it that no matter how eminent the individual may be nor how great his authority in general scientific questions, his mere opinions or assertions will in no case supply the absence of actual experience in a case like this.

The members of the Academy are aware of the course of the disease since the beginning of July, after the unsuccessful attempt to arrest its progress by sanitary cordons, which were themselves attacked by the disease. They also know that the cholera entered Cairo about the 14th of July; they know, too, that it is spreading with

great rapidity, but they do not know how destructive it is, for the English authorities who have taken possession of the sanitary service publish only such statements as they think proper to communicate to the public. It is certain, however, that the cholera will be severe in Cairo, and that it will thence extend to other parts of Egypt.

The first care of the English authorities has been to place the English soldiers, as far as possible, in safety by sending them to camp at a distance from the city. Notwithstanding all this it has been affirmed that some of the soldiers have been attacked.

If Alexandria should be attacked there is doubt that the danger for Europe would be very great, and the most important question at present is to determine the possibility of escape. Although cases may be found at present, as they are at this period almost every year, which have only a general resemblance to Asiatic cholera, it is still certain that the disease has not extended beyond Egypt.

In 1865 the disease spread very rapidly, and Europe was then unprepared to protect itself. To-day the case is different, and it might be said that in some respects the means of protection adopted are too severe, and in this respect England is paying dearly for the grave fault committed in Egypt. For refusing to adopt necessary measures of precaution on some of her ships which were trading with Egypt, she now sees her whole commercial system rudely interrupted. The quarantine restrictions adopted by almost every country in Europe are more stringent than necessary, but it is one thing to impose restrictions and another to enforce them; the danger is that some weak point will be neglected and that the scourge will thus find an entrance. The danger of invasion is in an indirect ratio to the distance of the point from which the place is menaced. For this reason Syria is in greatest danger on account of its proximity to Egypt, but the extension of the disease to that country would not necessarily cause it to spread to Europe.

The situation would be different if the disease should make its appearance in Constantinople. It would be impossible for Russia, Roumania, Bulgaria, and the neighboring countries to ward it off, for the soil is well prepared for its reception. Then Greece is next in point of exposure, but by strict quarantine she might be successful in warding off an attack on account of her insular position. Trieste is less secure, and, indeed, it is one of the weakest points in Europe.

The Italian Government has thus far done its best to ward off an attack, but of what avail are good intentions when the resources are insufficient and when the agents charged with carrying out the preventive measures are notoriously corrupt? It is also probable that the greater part of the refugees will seek the Italian ports, and there is reasonable grounds to fear that that country may become the port of entry for the introduction of cholera into Europe. I pass by Spain, for there is little danger from that country. The active and efficient measures adopted to protect the coast of France from the disease give reason to hope that the country will be safe from all danger from that direction. But it must be remembered that the strictest measures will only have a limited influence from the moment that cholera is admitted into any part of Europe. From that moment no absolute barrier can be opposed to its spreading from one place to another, until all Europe will have been invaded. From that time little will remain to be done further than for each country to enforce such measures of local hygiene as will render the attack as light as possible. The point of highest interest, therefore, is to prevent the disease from gaining a foothold anywhere on the continent.

It is a disputed point whether England, by obstinately refusing to adopt any protective measures at home, may not become the means of introducing the disease into Europe. I do not think there is any danger to be feared from this source. It must be borne in mind that England is in constant intercourse with all the different countries of India in which cholera is always found, and yet she has never brought home directly a case of Asiatic cholera. The length of the voyage from Port Said to England is at least fourteen days for the fastest vessels. But if fourteen days are passed without the appearance of any symptoms of cholera on board a ship there is no danger of importing the disease by persons on board, and as the Government has declared that in case of a cargo being suspected measures for disinfecting it have been ordered, nearly all sources of danger from that source have been removed.

The history of cholera in England shows that whenever that country was attacked the disease was brought from the northern seas.

From these considerations can it be asserted that there are still chances that Europe may escape the dreadful epidemic that threatens it? Taking into consideration the course of former epidemics of cholera, I do not hesitate to declare in the affirmative. One peculiarity has been that the more rapidly the disease has spread and the more violent has been its ravages in the countries attacked, the shorter has been its duration and the more rapid has been its extinction.

Such was the epidemic of 1865 in Egypt. The disease had disappeared before the physicians sent from Europe to combat it had arrived; and judging from the course of the present epidemic it is probable that the disease will have disappeared from Egypt in a month or five weeks.

I will not go so far as to say that at the end of that time all danger will be removed from Europe, for there will remain for some time lingering cases, and the country will not have been fully disinfected; but the danger will be very much lessened and protection will be much easier. If, then, Europe escapes the disease for four or five weeks longer there will be little to be feared.

To sum up, it may be said that the Asiatic cholera which is now raging in Egypt was brought from India.

This introduction was caused by the suppression of the measures that had been previously adopted for the protection of the country.

The responsibility for the introduction rests entirely on England for insisting on carrying out the sanitary code which she has adopted in India.

Europe is to-day gravely menaced by the disease, but, thanks to the measures of defense adopted by nearly every country, it is probable that the epidemic will be confined to Egypt, and there is good ground for the hope that it will there be speedily extinguished and Europe freed from farther danger for the present.

CHOLERA IN SHANGHAI.

No. 3087.]

UNITED STATES CONSULATE-GENERAL,
Shanghai, August 7, 1883.

SIR: I have the honor to hand you herewith inclosed a copy of a report which Dr. Henderson, the health officer of Shanghai and the attending physician upon the United States consular jail, has submitted in regard to the appearance of Asiatic cholera at this port. What the doctor says with reference to the character of the disease, its mode of treatment, &c., I hope may be found of interest to you.

I am, sir, your obedient servant,

O. N. DENNY,
Consul-General.

Dr. J. L. CABELL,
President of the National Board of Health,
Washington, D. C.

REPORT ON CHOLERA IN SHANGHAI FROM 1862 TO 1883.

By DR. EDWARD HENDERSON, F. R. C. S., *Municipal Surgeon and Health Officer.*

QUARANTINE AGAINST CHOLERA IN SHANGHAI.

Asiatic cholera was epidemic in Shanghai in 1862 and 1883, both natives and foreigners suffering severely. In 1867 and 1868 we have accounts of limited outbreaks of the same or a similar disease. From 1869 to 1874, inclusive, as far as is known, there were no cases of cholera among foreigners in Shanghai; but in 1875 nine deaths were certified as due to that disease, and the following table, taken from my report addressed to the council last year, shows the yearly mortality in the foreign population from cholera since 1874:

Year.	June.	July.	August.	September.	October.	November.	Total.
1875					5	4	9
1876	1						1
1877		1	2	9	3	1	16
1878			3	8	3	2	16
1879			1	1			2
1880				2			2
1881				7	6		13
1882			3	8	4		15
Total	1	1	9	35	21	7	74

Nearly every year since I arrived in China (1868) rumors have been current during the hot weather of a more or less serious mortality among the natives, dependent on a disease that in its reported symptoms and rapid course to a fatal termination seemed at least closely to resemble true cholera. Occasionally it happened that cases of this

kind were received into one of the native hospitals; thus in July of 1872, a year during which no deaths from cholera were registered among foreigners, two cases were admitted to the Shantung Road Hospital, under Dr. Johnston's care; I had opportunity of examining these and considered the diagnosis true cholera as established. Both cases terminated fatally within twenty-four hours of their admission to the hospital. Returns of the deaths occurring among the natives inhabiting the foreign settlement north of the Yangking-pang were obtained last year for the first time. Cholera is, it would appear, a disease well known to the Chinese in this district under the name of "fa-shah," deaths from fa-shah being the deaths of adults in a few hours where the chief phenomena observed are profuse vomiting and purging with collapse. Last year 109 deaths from "fa-shah" were registered between the 1st of August and the 31st of December. This year, as in former years, cholera has again made its appearance in the settlement. The first death in the foreign population was on the 31st of May, and the table appended shows the total mortality up to the present date. Among the natives 107 deaths from fa-shah have been registered, viz: February, 1; March, 1; April, 1; May, 5; June, 6; July (to 28th), 93.

Deaths among foreigners from cholera in 1883, to July 28.

No.	Date.	Sex.	Age.	Duration of illness.	Occupation.	Remarks.
1	May 31..	M.	33	1½ days...	Sailor.....	Resident three months; out of employment.
2	June 17..	M.	44	1 day.....	do.....	Resident several years; out of employment.
3	July 11..	M.	27	6 days.....	do.....	American bark Obed Baxter; arrived June 25.
4	July 13..	M.	25	33 hours...	Schoolmaster..	Resident one year; Sezechum Road.
5	July 16..	M.	20	7 hours.....	do.....	Russian steamer Peter der Grosse; arrived July 8.
6	July 18..	M.	29	.....	do.....	American ship Syren; arrived July 7.
7	July 21..	M.	.....	4 hours.....	do.....	American bark H. D. Dudley (arrived May 6); shipped in Shanghai; staying at Temperance Hall.
8	July 21..	M.	42	2 days.....	Mining engineer..	Staying at Temperance Hall, Nankin Road; one month.
9	July 22..	M.	38	17 hours...	Sailor.....	American bark Obed Baxter (see No. 3); admitted to American jail July 12.
10	July 22..	M.	24	1 hour.....	do.....	American ship Syren (see No. 6).
11	July 23..	M.	27	8 days.....	do.....	From British consular jail; in jail a few days; from British ship Antwerp; arrived June 28.
12	July 25..	M.	36	14 days.....	do.....	H. M. S. Kistral; arrived June 9.

The type of the disease observed in Shanghai in the foreign population is invariably severe, justifying the opinion that we have to deal with that form of cholera that is distinguished by such terms as Asiatic, true, and malignant. The cases which have already occurred this year in Shanghai have been of this nature, differing only from the cases observed in former years by the fact that premonitory diarrhoea has been noted as a feature in all or nearly all of them. There is nothing in the phenomena observed in the sporadic cholera seen in Shanghai which would distinguish the cases from those encountered when epidemics of the disease visit Europe or cause widespread mortality among the natives of India. The fact that the cases are sporadic, and that epidemics, if we admit their occurrence at all, are limited, proves nothing to my mind save that in Shanghai those conditions—atmospheric and other—which determine epidemic prevalence of the disease have been hitherto happily wanting. When I learn, as I do now, that cholera is "epidemic" at Swatow or other coast ports, I do not for a moment doubt that the cholera we have at present examples of in the settlement is one and the same disease. Cholera, if not epidemic in Shanghai in the same sense that it is regarded as epidemic in the "cholera area" of British India, is still in its yearly recurrence, in my opinion, at present independent of any importation of the specific poison from without. In framing quarantine regulations for Shanghai it is distinctly to be understood that we have in view only the limitation of a disease which is already present in the community.

The development of cholera in Shanghai seems to be closely connected with individual hygiene. The natives suffer first and chiefly, next the paupers, a very limited class in the foreign community, and the shipping; lastly, and hitherto quite exceptionally, the well-to-do foreign residents are attacked. From these facts and others which it is needless to detail here I am led to the conclusion that exposure, dirt, overcrowding, insufficient and improper food, overfatigue, and intemperance are predisposing causes. The real factor in the production of the attack is, however, I believe, a specific poison swallowed along with some article of food or drink consumed by the victim. From what we know of cholera generally we have good reason to believe the discharges from the bowels and the fluids vomited by the sick contain the specific

poison, and are, indeed, the principal means by which the disease is disseminated. Water is generally recognized as one, and perhaps the principal, medium by which the cholera poison is conveyed from the sick to the healthy, and I have always regarded the river water in Shanghai, unless carefully treated by the consumer, as a principal source of danger. In framing quarantine regulations for the port the conservancy of the river ought, in my opinion, to be a first consideration.

I have never seen cholera in Shanghai spread from the sick man to his attendants, and I have no reason to believe that the exhalations or emanations from the bodies of cholera patients are capable of communicating the disease. A litter transporting a small-pox patient from a ship lying in the river to the hospital on shore may be the means of communicating that disease to the unprotected passer-by, but, due provision being made for the discharges of the patient, there is, I believe, comparatively little risk in transporting cases of cholera, even through a crowded thoroughfare. I do not, of course, advise that such risks should be unnecessarily incurred, but if my views are correct we have again a point which may be of some importance in the management of imported cholera.

Asiatic cholera has an incubation period, as it is termed, which may certainly last for ten or twelve days, and there are well-attested cases on record in which it has extended over a period of more than twenty days. It is the calculation of this period which determines the duration of the quarantine imposed on the healthy who have been brought immediately in contact with the sick; such a quarantine as at present enforced at Marseilles in the case of the passenger steamers conveying the mails through Egypt. It is manifest without further discussion that quarantine of this kind could never be enforced at Shanghai.

Cholera, it would seem, can be communicated by persons who are themselves but slightly affected by the disease, so slightly as to readily escape detection on board of foreign vessels visited by competent sanitary officers. This is an important consideration, and when we reflect that the introduction of cholera in Shanghai is mainly to be dreaded through the natives who enter the settlement by the river, by land, and by all the numerous creeks which intersect the surrounding country, we cannot fail to see clearly that no very important results are to be expected from quarantine against cholera in Shanghai.

It will be found practically impossible to detain sick natives in the hospitals until they are cured and no longer able to communicate the disease. This is a point which is apt to be lost sight of by the general public, which advocates quarantine regulations for the port, but it is one on which those who have had experience in the management of native hospitals in China must lay considerable stress. It is from a somewhat extended experience of this kind that I am able now to state the matter as authoritatively as I have done. I can conceive of nothing short of a well-guarded jail which would enable us to seclude cases of infectious disease among the natives.

In cholera those who are slightly attacked would only remain in the hospital as long as it suited their convenience, while in graver cases the near approach of death would be too often taken as a signal for removal by friends. Unless under special provision made by the native authorities we are powerless in Shanghai to interfere with the liberty of the Chinese in this particular.

The highest aim of quarantine is of course the complete protection of a community from the disease which it is instituted to guard against. In Europe and America attempts to exclude cholera by this means have usually, if not invariably, failed; in Shanghai they would certainly be found ineffectual. In Shanghai, however, at the present time such complete protection does not much concern us, for cholera has already made its appearance in the settlement. But although rigid quarantine cannot be applied to Shanghai, carefully framed quarantine, or, if the term be preferred, sanitary regulations may be of service in limiting the spread of the disease by fresh forces of infection introduced from without. The local authorities ought certainly to have the fullest information possible regarding the arrival of ships on the river with cases of cholera on board; but, once at the lower limits of the harbor, there ought to be no delay in landing the sick and conveying them for treatment and seclusion to the general hospital or one of the native hospitals if their number is small, or to a hospital specially prepared for their reception if their number is large. We have in Shanghai no lazaretto to which those in health on board such vessels can be sent and kept under observation until such time as all risk of their developing the disease is at an end; but it seems desirable, if practicable, that persons so situated should remain on board their ships until they are passed and cautioned by the visiting port surgeon. The disinfection of the ship and the regulation of the food and water supply of the crew are points on which an inspecting officer might give much valuable advice to the captain, and this indeed ought to be a part of his duty on board. I inclose a rough draught of what I conceive the tenor of such advice should be. Should epidemic cholera seriously visit Shanghai, our hospital accommodation might almost certainly be overtaxed, and the separation and management of the sick would doubtless become a great source of anxiety to the authorities. At the moment,

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I know of but two convenient sites for the erection of temporary hospitals; the neighborhood of the church at Pootung, the church itself being perhaps utilized and the lower limits of the Ningpo wharf, where possibly there is already some godown accommodation. The British consular jail would afford excellent hospital accommodation for a large number of patients, but the authorities might not see their way to give it up for such a purpose. To all these points patients could be conveyed by water, if it was thought desirable, to avoid their transport through the streets of the settlement.

EDWARD HENDERSON, M. D., F. R. C. S.,
Municipal Surgeon and Health Officer.

TYPHOID FEVER IN LIEGE.

DEPARTMENT OF STATE,
Washington, March 6, 1883.

SIR: I inclose to you herewith, for the information of the National Board of Health, and, if deemed advisable, for publication in its bulletin, a copy of a dispatch (No. 96), of the 15th ultimo, received from Mr. Fish, American minister at Brussels, in regard to the epidemic of typhoid fever at Liege.

I am, sir, your obedient servant,

JOHN DAVIS,
Assistant Secretary.

Dr. CHARLES SMART, U. S. A.,
Secretary National Board of Health, Washington City.

TYPHOID FEVER IN LIEGE.

REPORT OF HON. NICHOLAS FISH, *Minister Resident at Brussels.*

No. 96.]

LEGATION OF THE UNITED STATES,
Brussels, February 15, 1883.

SIR: I have the honor to inclose herewith a copy of a report of the burgomaster of Liege concerning the epidemic of typhoid fever in that town, which may prove of interest to the National Board of Health. It is published in the *Moniteur Belge* of this morning.

The epidemic began early in December last, its first victim dying on the 17th of December. The report extends to February 11, inclusive, during which period 341 persons suffering from the disease were admitted to the civil hospitals. How many were treated in the military hospitals and in their own houses is not stated in the report.

There have been 182 deaths during the same period. These occurred as follows: 144 in their dwellings, 24 in the civil, and 14 in the military hospitals.

The greatest mortality appears to have been among the males of from 20 to 25 years of age, and among the females between 15 and 20 years of age, amounting to 27 of each, or nearly 8 per cent. of the whole number. Of the 182 deaths, 88 (or 48 $\frac{2}{3}$ per cent.) were among persons between 15 and 25 years of age; while but 21 (or 11 $\frac{1}{2}$ per cent.) occurred among those over 30 years of age. The deaths among females were 101 (or 55 $\frac{1}{2}$ per cent.) and among males 81 (or 44 $\frac{1}{2}$ per cent.).

The population of Liege was 123,131, under the census of 1880, and the density of population 66 per hectare, or 26 $\frac{2}{3}$ to an acre. The sexes were divided as follows: Males, 58,740 (or 46 $\frac{2}{3}$ per cent.); females, 64,391 (or 53 $\frac{2}{3}$ per cent.). Liege covers about 4,650 acres of ground, of which about 750 acres are built upon.

The epidemic was at first light, there being but 8 deaths from December 17 to 31; and 1 only from January 1 to 10. From the 11th to the 31st January there were 110 deaths. From February 1 to 11 there were 73; and the greatest mortality, 15 deaths, occurred on the 5th of February. From the 7th instant there was a decrease in number of deaths, they being 5, 4, 2, 3, 1 from the 7th to the 11th, respectively.

In view of the recent floods and inundations in the United States it should be borne in mind that Liege is in a district which suffered greatly by the floods last summer and autumn; that it is situated on the banks of the Neuse, one of the overflowing rivers, and that the winter has been an exceptionally mild one, strongly resembling the ordinary spring weather on the banks of the Ohio and in that neighborhood. The epidemic was preceded by an unusual continuance of rainy weather.

Believing that it may not be altogether uninteresting, I have elaborated the tables of the report in such a way as to facilitate a comparison of the ratio of cases *admitted to the civil hospitals* and deaths among the different sexes and ages with their ratio to the population. It should, however, be remembered that the number admitted to the hospitals includes only those admitted to the civil hospitals, whereas the table of deaths includes those dying in the military and civil hospitals as well as those in private houses. Those tables are as follows:

Cases admitted to the civil hospitals.

Admitted to civil hospitals December 1, 1882, to February 11, 1883.	Males.		Females.		Total.	
	No.	Per cent.	No.	Per cent.	No.	Per cent.
Under 5 years.....	6	50	6	50	12	3.5190
From 5 to 10 years.....	18	72	7	28	25	7.3813
10 to 15.....	10	32	21	68	31	9.0909
15 to 20.....	39	44	49	56	88	25.8064
20 to 25.....	39	44	49	56	88	25.8064
25 to 30.....	22	50	22	50	44	12.9032
30 to 35.....	12	46	14	54	26	7.6246
35 to 40.....	4	40	6	60	10	2.9826
40 to 45.....	3	60	2	40	5	1.4340
45 to 50.....	3	60	2	40	5	1.4340
50 to 55.....	2	67	1	33	3	0.8797
55 to 60.....	1	100	.....	.....	1	0.2932
Over 60 years.....	1	33	2	67	3	0.8797
Total.....	160	46.7	181	53.3	341	100

Deaths from December 17, 1882, to February 11, 1883.

Deaths from December 17, 1882, to February 11, 1883.	Males.		Females.		Total.	
	No.	Per cent.	No.	Per cent.	No.	Per cent.
Under 5 years.....	9	43	12	57	21	11.5098
From 5 to 10 years.....	8	35	15	65	23	12.0879
10 to 15.....	7	39	11	61	18	9.8901
15 to 20.....	16	37	27	63	43	23.6318
20 to 25.....	27	61	17	39	44	24.1813
25 to 30.....	5	42	7	58	12	6.5940
30 to 35.....	2	33	4	67	6	3.2967
35 to 40.....	2	33	4	67	6	3.2967
40 to 45.....	1	33	2	67	3	1.6484
45 to 50.....	1	50	1	50	2	1.0989
50 to 55.....	2	100	.....	.....	2	1.0989
55 to 60.....	1	50	1	50	2	1.0989
Over 60 years.....	.....	.....	.....	.....	.....	5671
Total.....	81	44.3	101	55.7	182	100

In the foregoing tables the figures in heavy type indicate a preponderance of either sex beyond its normal census rate. As above stated that rate is 46.7 per cent. for males, and 53.3 for females.

In regard to the sanitary measures adopted the report says that the drains were flushed with extraordinary quantities of water, and disinfectants were freely used in them and on the portions of the streets where any unhealthy matter could possibly exist. The barracks, small streets, and alleys were carefully superintended. The lodgings of the workingclasses were frequently visited to urge upon the latter the necessity of cleanliness during the epidemic. Other measures of a local nature were taken, but from the report the measures appear to have been adopted after the epidemic had declared itself. It is more than likely that their earlier adoption would have prevented this dangerous disease carrying off one inhabitant out of every 675 of the population, or at the rate of nearly 1 per cent. (0.965 per cent.) per annum, while it attacked a much larger proportion. To any one familiar with the disease and its baneful effects these data will convey a true but appalling picture.

These figures concerning the epidemic at Liege, a manufacturing town on the borders of a considerable river, should furnish a warning to the authorities of our own towns after the *débris* of the present inundations shall have been cleared away. Forewarned is to be forearmed, and if this dispatch shall have helped in that result it will have more than repaid the labor it has cost.

I have written to the consul at Liege to furnish the Department with fuller details of the epidemic, which I am glad to say is diminishing.

I have the honor to be, sir, your obedient servant,

NICHOLAS FISH.

LEPROSY AND THE MEANS TAKEN TO PREVENT ITS SPREAD AT MARACAIBO.

DEPARTMENT OF STATE,
Washington, January 5, 1883.

SIR: I send you herewith inclosed a copy of a dispatch from our consul at Maracaibo, which gives an interesting account of the establishment and management of the leper hospital at that place.

I am, sir, your obedient servant,

JOHN DAVIS,
Assistant Secretary.

JAMES L. CABELL, LL. D.,
President of the National Board of Health, Washington, D. C.

No. 190.]

UNITED STATES CONSULATE,
Maracaibo, December 4, 1882.

Hon. WILLIAM HUNTER,
Second Assistant Secretary of State, Washington:

SIR: In referring to the establishment for the isolation and treatment of sufferers from leprosy, which disease, already widely disseminated, is increasing perceptibly, I beg to submit a few remarks regarding an institution of this section which merits worthy notice, and to which I am happy to be able to extend unqualified praise.

Although it is more probable that elephantiasis has existed in this country from a remote period, it is claimed by native authorities that until 1825 this section was free from this social scourge, and that in that year a native of Santo Domingo, suffering with the disease, landed at Maracaibo and spread the infection until it has finally culminated in a serious social problem.

In 1828 the growing evil of leprosy attracted the attention of the more thoughtful, and the initiative was taken in this section by the renting of an island in the lake situated about 4 miles south of Maracaibo.

This was accomplished by the National Government under the auspices of Bolivar, and in 1831 the island lazaretto was placed under the direction of the deputies to Congress from the province of Zulia.

In 1841 the island was definitely purchased and transferred to the state of Zulia, the Federal Government erecting buildings for the reception of patients, and in 1873 extensions of these were added.

It was not until 1876, however, that a movement was fairly inaugurated, deserving unlimited praise, and which has continued with constant zeal and energy to the present day.

At that period various ladies of Maracaibo set seriously to work to secure funds for the amelioration of the condition of these unfortunates, and for the vigorous prosecution of the task of apprehending and isolating in the lazaretto of the cases of disease still at large, which had then assumed alarming numbers, such as to seriously endanger the sanitary future of this section.

This work is both difficult and disagreeable, the friends of the infected, from a mistaken kindness, diligently concealing them from the search of the authorities.

The humane efforts of the ladies were well seconded by society in general, and in 1879 a fresh impetus was given to this work of charity by the appointment of a "Junta" with extended powers to apprehend all lepers, send them to the island, and to dictate measures for their maintenance and treatment and for the general discipline of the institution. It is to the work of this organization that I would call special attention, and the result of their labors has been extraordinary, considering the many obstacles encountered and the little aid extended by the Government to this work of truly national importance.

In various parts of the republic there are places designated for the treatment of

leprosy, but the Maracaibo lazaretto is the only one organized on a systematic and extended plan, and it is hoped that, in view of the exceptional advantages, it will be decided upon as the place of reclusion for the entire country, in which case it will no doubt become a point of great interest to the medical and the philanthropic world.

Both in this country and in Colombia leprosy is encountered in all its modifications, from the slight discoloration of the skin to the most horrible forms of mutilation, and the record of the various modes of treatment and their results may be studied with much interest by the faculty.

My visits to the island have much impressed me with its suitability, and the system in vogue cannot be too highly commended. The locality is designated as the "Isa de la Providencia," is situated about 4 miles south of the city, and enjoys a fresher and much more agreeable climate than Maracaibo itself. At present there are but about 125 patients under treatment, although it is believed that there are at least 400 still at large in the city and its environs, who are being apprehended as rapidly as is possible with the limited resources at the disposal of the junta, who as yet have a certain income of only about \$1,200 monthly.

The interior arrangements of the island are excellent. Capacious cisterns insure a supply of fresh water, and the diet is abundant and wholesome, the entire monthly cost of the maintenance and treatment of each person amounting to 16½ pesos, equal to about \$12.50 in American money.

A comfortable building has been erected for the use of the employes, while for the patients a large edifice of concrete, forming a parallelogram with a courtyard in the center, is divided into separate apartments, plainly but sufficiently furnished.

A pleasant feature is the establishment of cottages with grounds, in which reside those patients whose means permit it. Land is freely given to any one who is able to erect a dwelling, and as there are many who possess certain incomes, little homesteads are soon formed, giving a cheerful side to the sad picture presented by this terrible disease.

It was at first a mooted point as to whether marriages should be permitted among the patients, and after a lengthy investigation and discussion it was finally determined that past experience warranted the almost certain belief that such unions would prove unfruitful, and consequently several weddings have taken place, while others are in anticipation. It should be here mentioned that pregnancy has not as yet resulted in any of these cases, and, should the theory of sterility be correct, it seems laudable on the part of the governing body to allow this alleviation of their woes to be extended to the wretched creatures under their care.

The experiment, however, can only be made when both parties are lepers, as a union between a sound and a diseased person would almost infallibly result in the propagation of diseased offspring.

The result of these marriages has been to induce more cheerfulness and resignation, and to add greatly to the good discipline of the institution.

With the establishment of matrimonial relations and the system of separate cottage homes for those who desire them, the island begins to present the aspect of a rural municipality. Its extent is little more than a mile square, with good soil, of which advantage has been taken by more well-to-do patients for the cultivation of various products and the breeding of large numbers of goats. The territory has been artificially stocked with game, which is now becoming abundant, and nothing seems to have been omitted to secure the comfort and welfare of the unfortunates whom Providence has chastised so heavily.

Those whose means permit it are allowed to furnish little shops for the sale of miscellaneous articles, liquor, however, being strictly debarred.

Weekly visits of friends and relatives are allowed, which are looked forward to with eager anticipation, and are appreciated by the poor exiles from society as bright eras in their life of sadness.

Reading matter is periodically furnished, and occasional musical entertainments, to which the people generally are ardently attached, are provided; all the efforts of the junta being directed to the establishment of a veritable home for the patients, where they may, as far as possible, forget their afflictions and pass their lives in cheerfulness.

The discipline is mild and judicious, and punishment is meted out with justice and humanity to evil-doers, a proportion of whom must naturally be found in every community, even of lepers.

The disease assumes various phases, the most common type being the tuberculous, manifested in distorted features, enormous pendant ears and lips, and an abundance of exaggerated wrinkles. I have seen children of both sexes, of twelve or fourteen years of age, with the features and bearing of octogenarians, and the saddest cases that came under my notice were of this class. In persons of more advanced age, blindness and mutilation of the extremities are common.

Fingers and toes drop off or are peeled off by the patients themselves without pain or loss of blood. In other cases the body is a mass of scales, or, perhaps, almost an entire ulcer.

Opinions differ as to the possibility of radically curing the disease, but I regret to say that the records of this asylum give but little encouragement to the optimist. No authenticated report of absolute cure of a properly diagnosed case of leprosy can be cited during the fifty-four years existence of the Maracaibo lazaretto.

Various methods of treatment have been tested, the most recent being that of the oil of chaulmoogra, synopsis of which treatment was sent by me to National Board of Health, in September of last year. This remedy at first appeared to give excellent results, but it has not finally realized the sanguine anticipations formed regarding it. It has, in many cases, produced visible amelioration of suffering, but without radical benefit, has frequently induced severe stomaclic disorders, necessitating its discontinuance.

The Chaulmoogra treatment is entirely voluntary, and but few have persevered in its use.

The present secretary of the Government, a physician of high standing, and who has received a European medical education, in a communication to the junta, lays stress upon the arsenical treatment, not with a view to an ultimate cure, but simply as an alleviation.

He takes the ground of the incurability of the disease, and inclines to the French theory of the medullar origin of leprosy as opposed to the German idea of its parasitical character.

Here experience seems to demonstrate the correctness of the former theory, as were the disease parasitical it would no doubt be contagious, the reverse of which has been observed in this country.

There is at present at the lazaretto a case in point which speaks emphatically against the possibility of the disease being spread by contact.

About seventeen years ago a woman was admitted who has ever since suffered with elephantiasis of the most marked character. She was accompanied by her daughter, a child of three years of age, who has ever since resided on the island in daily intercourse with her mother and who is now her constant attendant. This young woman, now twenty years of age, has as yet no symptoms whatever of disease, having a perfectly clear cuticle and complexion, and being in all respects in a normal condition with very attractive features.

It is very possible that she also may be ultimately afflicted, but if so, it will be from hereditary taint and not from contagion.

Other examples more or less similar could be cited, but this one will serve to sustain the theory.

The secretary of Government, Dr. Lopez Baralt, judiciously recommended frequent autopsies of deceased lepers, which, with microscopic examinations of the blood and medullæ, may throw more light upon the nature and proper treatment of the disease.

I have no doubt that, should public peace continue, this establishment will eventually assume very extensive proportions, containing not only sufferers from all parts of Venezuela but also from a large section of Colombia, the latter being admitted upon payment of the actual cost of maintenance. This would no doubt be cheerfully assumed by the Colombian Government, as in the latter republic there is no place so favorably situated for the purpose as this lake retreat whose very existence seems providential.

In conclusion I would remark that the great obstacle encountered in the prosecution of this charitable work is the difficulty of apprehending the lepers who are scattered in all sections.

The general ignorance of the people leads them to form false ideas and apprehensions, and although many voluntarily present themselves for admission, yet the great majority shrink from what is really the most comfortable mode of existence open to them.

In this they are abetted by their friends, and it is a task of no small magnitude in a country where highways are few and imperfect and where communication is so difficult to organize a systematic and continuous search for these unfortunates.

The absolute necessity for such a movement for the protection of posterity seems now to be well appreciated, and it is to be hoped that effective measures may be realized.

I have been actuated in making the foregoing observations by a belief that the subject may possess some general interest, especially as this dread disease is said to have established itself in some parts of the United States.

Its ravages in the Hawaiian Islands are well known, from which point I received inquiries from Vice-Consul Hastings respecting the use of chaulmoogra.

A desire to call attention to a praiseworthy work of charity and sanitary precaution has also influenced me in the preparation of this report.

I have the honor to be, sir, your very obedient servant,

E. H. PLUMACHER,
Consul.

BERI-BERI.

No. 213.]

UNITED STATES CONSULATE AT CEYLON,
Colombe, March 5, 1883.

HON. JOHN DAVIS,
Assistant Secretary of State, Washington, D. C.

SIR: In my report No. 118, of March 5, 1880, I referred to a portion of the southern peninsula of India where beri-beri prevailed, but was unable to exactly fix the locality. It is now brought back to my mind through rereading the account of a partial survey of the Maldine Islands in the early part of this century by the commander of the East India Company's surveying ship Benares, that those islands, and not any particular portion of the mainland of India, were the infected locality I had read about, and I herewith quote *verbatim* from the aforesaid report upon the subject:

"Several of the crew were attacked with acute bowel complaints, and recourse to immediate and copious bleeding became necessary to save them. But a disease called beri-beri, a general swelling of the legs and body, proved fatal to three or four Lascars in a short time. This remarkable disease seems to be experienced in that part of the Indian Ocean comprehending the Maldives more than any other part of the India seas. The Lascars attribute this scourge to Maldiva wind, which they call *Maldiva-ka-baw*, expressive of the wind (baw) in the neighborhood of these islands, being, in their opinion, noxious. In two passages from Bengal, at different seasons of the year, many of our native sailors were attacked with the disease, also two or three Europeans. It commences with a depression of energy, swelling of the feet and ankles, sometimes rapidly ascending to the chest, which also swells, and then the afflicted person speedily dies. From the first symptoms of the disease till it produces death in some cases only a few days intervene; at other times the swelling may be confined to the legs for two or three weeks without reaching the chest, and then the disease may often be dislodged by nourishing food and anti-scorbutics; for this remarkable disease is usually found to prevail when, during long passages at sea, Lascars are obliged to subsist chiefly on rice, after their stock of fish, ghee, curry powders, or other animal productions have been expended, which occasions impoverishment of the blood."

The historian Riberio, writing an account of the Portuguese occupation of Ceylon about the middle of the sixteenth century, of which period he was contemporary, mentioning the diseases then prevailing, says: "There is another disease called berebere, to which Europeans are very subject. It is a sort of cramp, so violent that it prostrates those who are attacked with it, and the diseased part might be cut with a knife without causing pain. The best remedy is to eat pork and biscuit and drink palm wine," and to smoke. Three or four months' living in this way cures the patient entirely."

Riberio's bere-bere appears to me to be malarial fever, beri-beri, and elephantiasis, considerably mixed with perhaps several other complaints peculiar to swampy localities in the tropics, and the treatment he recommends is primitive enough in all conscience. Suffice to say, he was not a medical man, else he would probably have prescribed his remedy, his regimen, more as a preventative than a cure.

Finally, I have learned from an oriental work the fact that strangers coming to Ceylon in very ancient times were often attacked by a disease then called in Sanskrit *aja ghosta*, *anglice*, goat-voice fever; from *aja*, goat, and *ghosha*, voice. The symptoms and conditions of this ancient scourge as given in the Sanskrit *Pritkas* tally exactly with those described in the ancient manuscript; it is very much the same as that described in the foregoing account of the complaint in the Maldine Islands; and the treatment prescribed in the ancient manuscript is very much the same as that described by Percival. The very name goat-voice is derived from the fact that the patient, owing probably to an inflamed thorax, was unable to articulate properly, and therefore could only say bar-bar when attempting to speak, and the bar-bar of that period is now probably beri-beri. The cause of *aja ghosta* was said by the ancient practitioners to be poisonous, *i. e.*, malarial exhalations from the damp earth, and improper sustenance, &c.; and it was considered an epidemic disease. The treatment was anointing the body with herbs and spices and burying it in sand.

There are now at Anuradhapura, amidst the magnificent ruins of that ancient capital, immense stone troughs which modern explorers have conceived to have been watering-troughs for elephants, but which I am told by the learned Buddhist priests, and I believe it, were used for burying people in up to to the neck with sand who were suffering from *aja ghosta*.

Having now presented all the facts I have been able to gather during the past three years upon the subject of this unique disease, I submit that beri-beri is an acute form of scurvy, arising from bad atmosphere and improper nutrition, and likely to appear anywhere in the tropics where those conditions prevail, not at all peculiar to Ceylon, even though identical with *aja ghosta*, as that disease was probably prevalent in

* Probably today.

many parts of Asia, though left unchronicled for want of historical records, whereas Ceylon is famous for its ancient historical literature, by which a knowledge of such interesting facts is preserved and handed down to posterity.

It is evident enough that the disease only appeared on land in thickly wooded localities, where now, owing probably to the disappearance of forest and jungle, and to improved drainage, it is unknown. It is easy to understand its breaking out on ship-board among Lascars, most of whom are bred in the very localities where it is most likely to prevail, for those people would be predisposed to it, and when deprived of suitably nourishing food and confined, when debilitated, in the filthy and ill-ventilated quarters pertaining to their condition on board ship in those days, the disease would soon run riot in their miserable constitutions.

MOREY,
Consul.

PETRIE SEWAGE DISPOSAL SYSTEM.

DEPARTMENT OF STATE,
Washington, March 14, 1883.

SIR: I inclose herewith, for your information, a copy of dispatch No. 59, from the consul-general of the United States at Berlin, relative to the Petrie system of purifying sewage.

I am, sir, your obedient servant,

JOHN DAVIS,
Assistant Secretary.

JAMES L. CABELL, Esq.,
President of the National Board of Health,
Washington, D. C.

No. 59.]

UNITED STATES CONSULATE GENERAL,
Berlin, February 13, 1883.

HON. ASSISTANT SECRETARY OF STATE,
Washington, D. C. :

SIR: * * * The authorities of this city are now considering the question of adopting what is now known here as "the Petrie system" for the purpose of filtering or cleansing sewage. This system was invented by Dr. Petrie of this city, and letters patent have been issued to him, as I am informed, by the United States and other countries, as well as Germany.

Some two years ago the requisite machinery was constructed and proper arrangements made for testing the system of purifying sewage waters at the great prisons at Plötzensee, near this city. There are confined at this place some fourteen hundred prisoners, and then there are about six hundred attendants and others connected with such prisons, making some two thousand persons in all, as I am informed. In company with Minister Sargent, and public officials connected with the prisons, I visited the same a few days ago, more particularly for the purpose of inspecting this new system of purifying the sewage waters from such prisons than for the purpose of seeing the workings of the prison itself, although that was well worth our attention. We were informed by the prison officials that this new system of treating the sewage waters was a perfect success, and accomplished all that could be desired in that direction, and had proved entirely satisfactory to the governing prison board. I was also informed that this system has also been adopted at Leipsic, and other German cities, and that the same is giving the best satisfaction.

The Berlin city government has recently caused a very close examination of the working of the system to be made, as well as an analysis of the water after it has passed through the purifying process, for the purpose of determining as to the advisability of adopting it in disposing of the sewage waters of Berlin, and I herewith inclose a copy (translated) of a report made by Dr. C. Bischoff, an eminent chemist, on his investigation.

My object in mentioning this matter is simply that the attention of our boards of health, as well as of persons interested in hygienic science, may be called to this improved method of purifying and cleaning sewage and other filthy waters.

Should the United States be represented at the proposed hygienic exhibition here, I trust this matter may be carefully examined into, in order that our people may be carefully advised as to its benefits.

I am, sir, your obedient servant,

M. S. BREWER,
Consul-General.

THE PETRIE SEWAGE DISPOSAL SYSTEM.

Report of Dr. C. Bischoff on examination and analysis of sewage made before and after the process of purification patented to Dr. Petrie in Berlin.

[Translated by H. Knauff, Sanitary Engineer.]

The committee for the realization of Dr. Petrie's German Patent, No. 19,098, for "Innovations and improvements on the purification of sewage," has commissioned me to test the value of these improvements. Moreover, I have been commissioned with the analysis of unpurified and purified sewage taken from the experimental building in the vicinity of the penitentiary of Plotzensee, near Berlin, and particularly to give my opinion with regard to the advisability of allowing the sewage, purified after Dr. Petrie's method, to be admitted into rivers or other open watercourses.

In compliance with these requests, I submit the following report:

The method of sewage purification.—In the experimental building, the sewage of the penitentiary of Plotzensee is purified by repeated filtration and precipitation. As filtering material, turf dust of heavy quality is used, through which the sewage passes twice on its way. Besides the turfs, the sewage trickles through gravel and pebble-stones as a second purifying medium. Between the filtrations through the turf dust, which acts upon the sewage both in a mechanical and especially in a chemical way, the sewage is treated with quick-lime. The quick-lime acts also as well in a chemical (by cleaning) as in a mechanical way, because the surplus of quick-lime, which is changed by the admittance of atmospheric air into carbonate of lime, precipitates suspended matters of the sewage on the bottom of a cleaning-basin.

The process of the purification may be explained as follows:

1. The turf dust acts mechanically, *i. e.*, it keeps back all suspended matters of the sewage. The sewage is led sideways to the turfs; therefore the suspended matter or sludge remains on the inclined surface of the turf dust placed into the first entrance filter.

2. The turf dust acts chemically, *i. e.*, it absorbs the solution of organic matters. It retains ammonia, and finally acts as antiseptic on the putrescible matters which have been absorbed by or concentrated mechanically or chemically in the turf dust.

3. Gravel and pebble stones, as the last purifying medium, act only mechanically; their influence on the sewage depending on the attractive power of their superficies is a matter of no consideration. The pebble stones prevent the particles of turf and of carbonate of lime from being carried away, and promote the clarification of the sewage.

4. The quick-lime precipitates, in the first place, a considerable amount of organic matter. Numerous organic acids, which may originate from the state of fermentation of the sewage, combine with lime into salts, not, or at least readily, soluble. Proteine bodies (albumen, legumine, and other azotic substances), which yet exist in the sewage after the first filtration, are separated by the lime. The free carbonic acid always present in water, which brings about the solubility of the carbonate of lime, and the free carbonic acid proceeding from the fermentation, are fixed to the lime. During all these combinations precipitations take place on the bottom of the cleaning basin. In this basin the possible surplus of quick-lime turns into carbonate of lime with the carbonic acid of the atmosphere. The precipitations originating in this manner carry down mechanically suspended matters of the sewage.

The process of purification begins by the sewage passing the entrance filter. Diaphragms—*i. e.*, coarse weavings or sieves of brass wire—hinder particles of turf-dust from being carried away. The sewage, purified by this filtration, gets an influx of quick-lime, which comes in contact with the sewage in serpentine.

In the cleaning basin those matters which are separated by the lime process, and also the carbonate of lime produced by the admittance of atmospheric air, precipitate to the bottom. Now the sewage flows through a second or end filter filled with turf-dust, which acts on the sewage analogically to the entrance filter; besides this preventing the removal of the sludge, which remains on the bottom of the cleaning basin.

Finally, the water resulting from these processes penetrates the filter of pebble stones, and arrives sufficiently purified at the exit.

The result of the purification of the sewage becomes evident from the analysis of the sewage before and after the process.

Repeatedly I have examined the sewages. The last trial made with sewage taken from the pumping station of the Berlin Radial System III, Schönberger street 8, was made in my presence on the 26th of August.

The sewage showed the following quality and composition:

An impure sewage.—The sewage smells of fecal matter and putrified urine. It is of a brownish color, loaded with sedimental matter, and has a solid black and muddy deposit. If after precipitation of its suspended matter the clarified sewage is again

troubled, it soon afterwards swarms with bacteria, which appear on the surface of the sewage as floccose mucous film. According to this appearance the sewage was in a continued transmutation.

In chemically analyzing, I first defined the suspended matter of the sewage; then, after being clarified through filtering paper, which lets the water pass freely, the sewage itself was examined.

The quantity of suspended matter amounted to 400 in 100,000 parts, or 4 grains in one liter. The sewage alone, without suspended matters, showed the composition as follows (in parts per 100,000):

Total residue	49.166
Fixed residue, after wetting with carbonate of ammonium and restitution of carbonic acid	36.000
Loss on ignition	13.166
Lime	9.128
Magnesia	1.476
Peroxide of iron	Traces.
Soda (natron)	7.33
Potash	1.41
Ammonia	4.50
Chlorine	8.272
Sulphuric acid	1.936
Nitric acid	None.
Hyponitrous acid	None.
Phosphoric acid	0.96
Total nitrogen	5.88
Potassium permanganate consumed in order to oxidate the organic matters ..	21.30
Oxygen consumed in order to oxidate the organic matters	5.40
Silicic acid	1.50
Total hardness (English scale)	7.875
Permanent hardness	1.764
Temporary hardness	6.111

The suspended matter of the sludge, added to the solid matter soluble in the sewage, make up 449,166 parts of total suspended and solid matter in 100,000 parts of sewage.

Expressed by grains in gallons, we receive from the values above the following results (grains in an imperial gallon):

Total solid matter	314.4162
Suspended matter	280.0
Soluble matters	34.4162
Fixed soluble matters after restitution of the carbonic acid	25.20
Loss by igniting the soluble matters	9.2162
Lime in solution	6.3896
Magnesia in solution	1.0332
Peroxide of iron in solution	Traces.
Soda (natron in solution)	5.131
Potash in solution	0.987
Ammonia in solution	3.150
Chlorine in solution	5.7904
Sulphuric acid in solution	1.3552
Nitric acid in solution	None.
Hyponitrous acid in solution	None.
Phosphoric acid in solution	0.672
Total nitrogen in solution	4.116
Potassium permanganate consumed in order to oxidate the organic matters ..	14.91
Oxygen consumed in order to oxidate the organic matters	3.78
Silicic acid	1.05

According to the analysis, the sewage of the pumping station of the Radial System III, of Berlin, shows, without regard to the suspended matters, a solution of decomposable organic matter, partly azotic, partly free of nitrogen. The solution contains ample chloride of sodium, little phosphates, and ample ammonia. Their total mass is very much diluted by water generally composed like that of the Berlin water supply.

B. Purified sewage.—The sewage above mentioned passed the filters and the clearing basin of the experimental building at Plotzensee.

The discharged sewage was a little yellowish in color, and still a little turbid, especially by suspended sludge of carbonate of lime, which was not entirely precipitated in the cleaning basin, and not perfectly kept back by the end filters of turf-dust and

pebble stones. In the laboratory, the carbonate of lime precipitated, and then a clear fluid resulted of a very little, both yellowish-looking and musty-smelling. After some days a very thin film of bacteria appeared on the surface of the water, but soon it disappeared after remarkable development of *Paramœcium-aurelia*. The result of the examination of the purified sewage is given in the following tables (in parts per 100,000):

		Grains.*
Total residue.....	36.416	25.4912
Fixed residue after restitution of carbonic acid.....	33.06	23.142
Loss of ignition.....	3.356	2.3492
Lime.....	8.036	5.6252
Magnesia.....	Traces.	Unimportant.
Oxide of iron.....	Traces.	Unimportant.
Ammonia.....	1.5	1.05
Soda (natron).....	6.3	4.41
Potash.....	1.4	0.98
Chlorine.....	7.23	5.061
Sulphuric acid.....	1.968	1.3776
Nitric acid.....	None.	None.
Hyponitrous acid.....	None.	None.
Phosphoric acid.....	0.75	0.525
Potassium permanganate necessary for oxidation.....	3.476	2.4332
Oxygen necessary for oxidation.....	0.88	0.616
Total nitrogen.....	1.58	1.106
Silicic acid (German scale).....	1.65	1.155
Total hardness.....	8.1	5.67
Permanent hardness.....	2.5	1.75
Temporary hardness.....	5.6	3.92

Comparing the analysis of the impure sewage with that of the purified, we find, as the first result of Dr. Petrie's method, the removal of all suspended matters, while the organic substances are very remarkably diminished. The latter is shown by the lower loss of ignition, which in a great measure depends upon the presence of organic matters, and from the considerably less decomposition of potassium permanganate by the purified sewage; also ammonia, total nitrogen, hardness of the water, are essentially diminished. The amount of fixed alkalies and sulphuric acid vary inconsiderably; that of phosphoric acid varies insignificantly.

The cause of the favorable result of the analysis depends first of all upon the absorbing capacity of the turf-dust, which restrains both the dissolved organic matter and salts of ammonia. These substances are withdrawn even from an abundant afflux of impure water by the turf-dust, and kept indifferently whether more pure water follows or not. The total amount of nitrogen is firstly absorbed by the turf-dust, and secondly by the combination of organic matters with lime, which will act without question more powerfully, provided it is freely admitted to the sewage. Neither the total free carbonic acid nor the half-combined carbonic acid of the water are remarkably altered. Theoretically, the amount of lime ought to be diminished up to the quantity depending upon the solubility of the carbonate of lime. I am convinced of a yet better purification of the sewage by a more energetic action of the carbonate of lime on the total process.

However, there is no doubt that a substantial objection against the admission of such purified sewage water into rivers cannot be made. Indeed, the purified sewage is more pure than numerous well waters of Berlin and the waters of the Spree River and its channels, as "the Greine Graben" and "the Luisenstadtsche Canal." Further, considering that the quantity of purified sewage is very small in comparison with the quantity of water of the river, in which the former is admitted, the purified sewage appears to be so inoffensive that the possible pollution of the river is of no importance.

Of course, we must not forget the quality of the purified sewage depends upon the quality of the impure sewage. The question is: To what degree was the sewage diluted, and how large was the quantity of water carried through the filter, together with the excremental matter? As the pollution of the river depends essentially upon the quantity of the suspended silt within concentrated sewage, and less upon the degree of the concentration of sewage, the mechanical result of the purification by the turf-dust is already highly important.

In the course of time the turf-dust abates in its chemical action. An occasional experiment in the absorbing capacity of the turf-dust used full three months showed the following composition of the sewage, which had been filtered after removal of the

* In an imperial gallon.

sinking and swimming substances, quick-lime having only been used in a very imperfect way (in parts per 100,000):

	Before filtration.	After filtration.
Total residue.....	49.75	45.28
Loss of ignition.....	10.00	7.3
Chlorine.....	8.638	8.35
Peroxide of iron and phosphoric acid.....	1.80	1.05
Ammonia.....	3.50	3.00
Potassium permanganate for oxidation.....	11.28	7.46
Nitric acid.....	None.	None.
Hyponitrous acid.....	None.	None.

It is true a remarkable weakness of some particular ingredients of the sewage took place, but generally the absorbing capacity of the turf-dust, with respect to ammonia and dissolved organic matters, is reduced to a minimum. Therefore, it is necessary that the absorbing capacity of the turf-filters be subjected to a suitable control. It seems necessary to treat the sewage, after removal of the suspended matter by blotting-paper, before and after the filtration on Nessler's reagent, and on 1.100 normal potassium permanganate as basis of the said control.

I mention that I formerly often examined the purified sewage when the experimental building was in an imperfect state. But I found in general a favorable result of the purification process similar to the one reported upon at present, according, of course, to the existing state of the building.

In consequence of all this, I conclude as follows:

That the purification of sewage and of similar impure water, as it is tried after Dr. Petrie's method in the experimental building at Plotzensee, qualifies itself for the cleaning of the sewage to such a point that the purified sewage can be allowed to be admitted in any water-course of the country, provided that a judicious control of the total process is managed. There is no doubt that also, on a greater scale, this process will succeed. Further, this process will frequently support irrigation farms in order to purify the abundant sewage, when, during winter months, vegetation cannot absorb sewage, or when the disposal of too abundant impure sewage seems to be impossible. But also without irrigation farms the process qualifies itself for sewage purification. With regard to the quantity and quality of the sewage, the dimensions of the building ought to be adapted to the special circumstances, particularly as far as the size and the number of the different filters is to be designed, likewise also the most suitable method of the alloy of lime, or eventually of other chemicals.

In the construction of the experimental building, the cover of the entrance filter is worthy to be mentioned. The cover consists of a lay of turfs spread out over a grate. The turfs are impregnated with phenol (carbolic acid) and sulphuret of potassium. This cover hinders the evaporation of ammonia and of miasms from the entrance filter, in which highly putrescible matters, i. e., the sinking and swimming substances of the sewage, are kept back.

The efficiency of the cover is so perfect that there is no annoyance by evaporations. The absorbing capacity of the cover is durable for a long time.

The turf-dust of the filters and the sludge of the cleaning basin contain valuable manurial substances.

The examination of the turf-dust, enriched up to exhaustion, showed 3.08 per cent. of nitrogen and 0.44 per cent. of phosphoric acid in the dried substance of the turf-dust. The latter itself amounted to 31.58 per cent. of the total mass of turf-dust. The sediments of the cleaning basin have not yet been analyzed.

There is no doubt that both substances are a valuable manure, the availability of which depends, of course, upon the composition of the soil. But neither the turf-dust nor the lime of the sediments are to be thought indifferent as admixture to other manure.

Finally, it might be interesting to compare the sewage purified after Dr. Petrie's method with underground water which has passed off over the irrigation farm of Osdorf. The 3d of June of this year the drain water of the "Lilowgraben," which discharges into the "Nunthe Rivulet," and further into the "Hazel River," showed the composition as follows (in parts of 100,000):

Residue.....	71.83
Lime.....	17.80
Magnesia.....	1.783
Peroxide of iron.....	0.45
Ammonia.....	0.28
Silicic acid.....	0.15
sulphuric acid.....	7.037
Chlorine.....	11.56

Nitric acid.....	Traces
Hyponitrous acid.....	0.563
Potassium permanganate for oxidation.....	3.607
Oxygen for oxidation.....	0.91
Phosphoric acid.....	Trace _s

In consequence of this analysis the water of the "Lilowgraben," delivered to me under official seal, was, on June 3, at the time of active vegetation, considerably more impure than the sewage purified at Plotzensee, with the exception of its lower amount of nitrogen. But I cannot pass over with silence that, in my opinion, other raw underground water containing lime and gypsum and other affluxes, as also other sources of chloride of sodium, influence, apparently, the quality of the water of the "Lilowgraben."

Influence of the water purified in the experimental building on animal and vegetable life.—In the clearing basin of the experimental building at Plotzensee, algæ settle copiously, chiefly green algæ, containing chlorophyl. These algæ perform a further purification of the sewage, and show evidently that the water, having been subjected to the purification process, is not injurious to the vegetation of plants containing chlorophyl.

In order to examine the influence of the purified sewage on animal life, I recommended fishes to be put into a basin, into which the sewage discharges continually. This trial showed that crucian and other fishes have not been affected in their state of health.

These practical trials ascertain evidently that the purified sewage is not injurious to animal and vegetable life of the rivers.

DR. C. BISCHOFF,

*Chemist of the Royal Chief Police Office,
and of the Royal Courts of Justice of Berlin.*

BERLIN, September 15, 1882.

H. Ex. 43—14

APPENDIX F.

REPORT OF COMMITTEE ON EPIDEMIC DISEASES.

[Senate Report No. 942, Forty-seventh Congress, second session.]

Mr. Harris, from the Committee to Investigate and report the best Means of preventing the Introduction and Spread of Epidemic Diseases, submitted the following report (to accompany bill S. 2259):

The Committee to Investigate and report the best Means of preventing the Introduction and Spread of Epidemic Diseases, to which was referred the bill (S. 2259) to repeal the tenth section of the act approved June 2, 1879, entitled "An act to prevent the introduction of contagious or infectious diseases into the United States, and for other purposes," has had the same under consideration, and reports the bill back with the recommendation that it pass.

The National Board of Health was created by act approved March 3, 1879, composed of one medical officer from the Army, one from the Navy, and one from the Marine Hospital Service, one officer from the Department of Justice, and seven members to be appointed by the President, by and with the advice and consent of the Senate, not more than one of whom shall be appointed from the same State, and on the 3d day of April of that year the Board organized and entered upon its duties.

By act approved June 2, 1879, additional powers were given and additional duties imposed upon the Board, for the purpose of enabling it to prevent the introduction of contagious or infectious diseases into the United States from foreign countries, or into one State from another, but the tenth section limits the operations and duration of this act to the term of four years from the date of its approval, and it will therefore expire on June 2, 1883, if the tenth section is not repealed.

The experience of the last three years under the present law (inoperative as portions of it have been) inspires a high degree of confidence in our ability, by the strict enforcement of the necessary and proper regulations, to effectually prevent the recurrence of epidemics in future in the United States.

In the yellow-fever epidemic of 1878, which raged so fearfully and fatally at New Orleans, Memphis, Holly Springs, and Grenada, and extended far up the Ohio River, and to many other places, the actual loss to the people of the United States in the element of material wealth, to say nothing of impaired health and loss of human life, is variously estimated by those best informed on the subject at from \$100,000,000 to \$200,000,000.

In his message to Congress, in December, 1878, Mr. Hayes said:

"The enjoyment of health by our people generally has, however, been interrupted, during the past season, by the prevalence of a fatal pestilence—the yellow fever—in some portions of the Southern States, creating an emergency which called for prompt and extraordinary measures of relief. The disease appeared as an epidemic at New Orleans and at other places on the Lower Mississippi soon after midsummer.

"It was rapidly spread by fugitives from the infected cities and towns, and did not disappear until early in November.

"The States of Louisiana, Mississippi, and Tennessee have suffered severely.

"About one hundred thousand cases are believed to have occurred, of which about twenty thousand, according to intelligent estimates, proved fatal.

"It is impossible to estimate, with any approach to accuracy, the loss to the country occasioned by this epidemic. It is reckoned by the hundred millions of dollars."

So gigantic in proportions and fatal in consequences was this epidemic that it produced general demoralization and panic, inducing all persons who could get away from the infected places to seek safety in flight, scattering throughout the country. Many of the fugitives were stricken down in other localities, thus spreading the disease over a large extent of country, producing a general state of apprehension and alarm, which prompted towns and villages, yet free from the pestilence, to establish shotgun quarantines for their protection, thus blocking the ordinary channels of communication and transportation, suspending commerce, and paralyzing the entire business of the country.

The epidemic of 1879 at Memphis and New Orleans made its appearance before the National Board had been able to perfect its plans of prevention; though it is, in the opinion of the committee, doubtful whether that epidemic could have been prevented, as it is not certain whether it originated from germs of the epidemic of 1878 which had survived, or in fresh importation of the disease.

But, under the rules and regulations adopted by the Board to deal with it, it was actually stamped out in New Orleans, and confined to the limits of Memphis; and, instead of the general demoralization and panic, with suspension of business, trade, and commerce, which pervaded the country in 1878, commerce and communication with the infected cities were *regulated, not stopped*, or even retarded to any considerable extent, and the general business of the country went on in its usual methods, and through its usual channels, without serious interruption.

Instead of panic and alarm, confidence and a sense of security pervaded the country. To illustrate, take the tonnage of a single railroad. The Illinois Central, at the one point of Cairo, sent to and received from the South in 1879, 100,470,000 tons of freight more than it received and sent for the same period in 1878, in addition to which the passenger trade was scarcely interrupted in 1879, while it was almost entirely suspended in 1878.

Dr. Rauch, secretary of the Illinois State board of health, from whose report the above statement is taken, says this result could not have been reached without the co-operation of the National Board of Health, and its utmost exertions were required to allay the fears of the local authorities.

The experience of the country during and since 1879 has inspired great confidence in the South and Southwest in the possibility of effectually preventing, or successfully dealing with and controlling, these epidemics.

The great transportation companies of the South, both river and rail, are unanimous in their approval of the action and methods of the National Board in dealing with such cases, because experience has shown that they give the necessary security against the spread of disease, without stopping, or retarding to any considerable extent, commercial intercourse.

They have learned from their own experience that the certificate of the National Board of Health as to the sanitary condition of any city or place is accepted by other cities and States as testimony coming from a strictly impartial and well-informed authority, independent of all local interests or influences, commercial or otherwise.

The action and methods of the National Board have been approved by the State and local boards of health throughout the country, almost without exception; by the American Medical Association, the American Public Health Association, the National Academy of Sciences, the transportation companies of the South and Southwest, boards of trade, cotton exchanges, and other associations of business men throughout the country. In the opinion of the committee the Board has accomplished much, and is capable of accomplishing highly important results of great benefit to the country, results which can be accomplished by no other agency.

The report of the board of scientific experts appointed in December, 1878, shows that yellow fever has invaded this country sixty-five times within the present century, and that the proof conclusively shows that almost all of these epidemics were the result of imported contagion from countries south of us, while in no case is there satisfactory proof that the disease ever originated in this country.

From the best information that the committee has been able to obtain, it is of opinion that neither yellow fever or cholera is indigenous to any part of this country, and that if we will adopt measures such as will effectually prevent their importation, we will be free from them forever.

We have had State and municipal boards of health for very many years in the past, but we have also had epidemics of imported contagious and infectious diseases not unfrequently within the same period. If we would prevent these epidemics we must have a general system applicable to every port through which contagion can be imported, uniform in its requirements in respect to quarantine, and rigidly enforced, without regard to local commercial interests or influences, and the time for greatest vigilance in the enforcement of these preventive measures is when the country is entirely free from these diseases.

But even when they have appeared the experience of 1879 has shown that, with proper care and effort, they can be confined within narrow limits, if not stamped out entirely. But to do this requires prompt action and an amount of means rarely, if ever, at the disposal of a municipal or State board of health.

The power to establish and enforce this general and uniform system is given to the National Board of Health, under the orders of the President, by the act which this bill proposes to perpetuate.

The protection of human life and the promotion of the public health are second in importance to no question which addresses itself to the consideration of the legislator, and Congress should, in the opinion of the committee, within the scope of its

constitutional powers, adopt such measures as will most certainly preserve the one and promote the other.

Our statute books furnish a large number of precedents wherein Congress has, within the last fifty years, regulated commerce with no other object or purpose than to give greater security to the health and lives of that portion of our people who chance to be afloat upon our waters.

It has required the inspection of the hulls, boilers, and machinery of steam vessels, and forbidden the use of those found to be unsafe.

It has prescribed the maximum number of passengers which may be carried, and prohibited the carrying of articles dangerous to human life on passenger vessels.

It has for many years maintained, and is still wisely maintaining, a light-house system and a life-saving service—the former at an annual cost of about \$2,500,00 and the latter costing annually about \$700,000.

It has forbidden, under penalty of forfeiture and destruction, the importation of adulterated or impure drugs and medicines.

With these precedents of long standing and constant repetition before us, the committee does not deem it necessary to review the numerous judicial decisions which the committee believes clearly show the power of Congress to regulate commerce in respect to the importation of contagion, as well as in respect to the importation of other things, or to attempt to draw the line, or define sharply exactly where the power of Congress to regulate commerce ends and the legitimate exercise of the police powers of a State begin.

Upon this point Justice Strong, in delivering the opinion of the Supreme Court of the United States in the recent case of *Railroad Company vs. Husen* (5 Otto, 472, 473), says:

"While we unhesitatingly admit that a State may pass sanitary laws and laws for the protection of life, liberty, health, or property within its boundaries; while it may prevent persons and animals suffering under contagious or infectious diseases, or convicts, &c., from entering the State; while for the purpose of self-protection it may establish quarantine and reasonable inspection laws, it may not interfere with transportation into or through the State beyond what is *absolutely necessary for its self-protection*. It may not, under the cover of exerting its police powers, substantially prohibit or burden either foreign or inter-State commerce. * * * The right can only arise from vital necessity, and it cannot be carried beyond the scope of that necessity."

This shows that the powers of a State in respect to this question are based upon and limited by the law of self-preservation, and can go no further than the protection of the people within its boundaries, while the power of Congress to regulate commerce is absolute, supreme, and exclusive.

But wherever the line may be drawn, or to what extent the police powers of a State may be supposed to go, the act which this bill proposes to perpetuate does not conflict or in any way interfere with any State or municipal board of health, or its rules and regulations. So far from it, it proposes to co-operate with them in the execution of all of their rules and regulations to prevent the importation of contagious diseases; and if, in any case, their rules and regulations are, in the opinion of the National Board, not sufficient to prevent such importation, then, under the orders of the President, the National Board is authorized to make such additional rules and regulations as, in its opinion, are sufficient; and when approved by the President of the United States they become valid, and the State or municipal board is requested to execute and enforce them; but if it fails or refuses to do so, then the President is authorized to detail or appoint an officer of the United States to enforce them.

Believing, as the committee does, that the powers conferred upon the President and National Board of Health by the act of June 2, 1879, are important to the country, the committee earnestly recommends the passage of the bill, so that they may be perpetuated.

The following appropriations have been made to meet the expenses of the National Board of Health:

By act of March 3, 1879.....	\$50,000
By act of June 2, 1879.....	500,000
By act of June 16, 1880.....	75,000
By act of March 3, 1881.....	75,000
By act of August 7, 1882.....	68,000
Making.....	\$768,000

And in addition to this there was appropriated, to be used only in case of epidemic—

By act of June 16, 1880.....	\$100,000
By act of March 3, 1881.....	100,000
	200,000
Making an aggregate of.....	968,000

Of appropriations which have been made and entered upon the books of the Treasury to the credit of the National Board of Health, and with these amounts standing to its credit the expenses of the Board for the first three years of its existence, ending April 3, 1883, aggregate \$506,216.17, or an average of \$168,738.72 per year—the whole expenditures for the three years being about \$44,000 less than the amount appropriated for the first year.

Much the greater portion of these expenditures have been made in aiding State and municipal boards in their quarantine work, in the enforcement of quarantine regulations necessary to prevent the importation of contagion into the United States or into one State from another, and in establishing and maintaining quarantine stations at Ship Island and Sapelo Sound—at the former of which places the Board found it necessary to construct a rude hospital, warehouse, and wharf of ample capacity, while at the latter they have used boats and tents.

These stations the Board found indispensably necessary for the care and treatment of infected vessels, cargoes, passengers, and crews.

Under the regulations of the Board a number of ships infected with yellow fever have been sent to these stations, and, after treatment, allowed to proceed to and enter our ports without giving rise to a single case of the disease.

The appropriation of \$68,000 by act of August 7, 1882, is inadequate to defray the necessary expenses of the Board for the fiscal year ending June 30, 1883, and notwithstanding there is an unexpended balance of unconditional appropriations standing to the credit of the Board on the books of the Treasury, no part of it can be used, because of the proviso to the last-named act, which provides—

“That no other public money than that hereby appropriated shall be expended for the purposes of the Board of Health. *And provided further,* That hereafter the duties and investigations of the Board of Health shall be confined to the diseases of cholera, small-pox, and yellow fever.”

The second section of the bill herewith reported authorizes the Board to use of the unexpended balance of the unconditional appropriations heretofore made and standing to its credit on the books of the Treasury the sum of \$124,000, or so much thereof as may be necessary to pay the expenses of the Board for the balance of the fiscal year ending June 30, 1883, and all of the year ending June 30, 1884. Authority to use this sum, added to the appropriation of \$68,000 for the fiscal year 1883, will make an aggregate of \$192,000 for the two years, or an average of \$96,000 a year for the two years ending June 30, 1883, and June 30, 1884.

And the third section authorizes the Board to use of the unexpended conditional appropriations the sum of \$100,000, or so much thereof as may be necessary, in the event of an epidemic during the fiscal year ending June 30, 1884.

With authority to use the funds as above suggested, it is confidently believed that the Board will be able to continue the efficient performance of its functions and prevent the introduction of cholera, yellow fever, small-pox, and other contagious diseases into this country from foreign countries or into one State from another.

If it be admitted, as it is believed all must admit, that the action and operations of the Board even tend to the preservation of life and health to any however small the extent, such fact makes it eminently worthy of our support, and in the opinion of the committee it should be sustained with such powers and means as will enable it to perform its functions fully, promptly, and efficiently.

When the memories of the fearful ravages of the epidemic of 1878 were fresh, both houses of Congress were ready to appropriate, and did appropriate, all that the committee asked for the purpose of endeavoring to find, if possible, a means of preventing the recurrence of this terrible scourge; but as the memories of the hundred thousand sufferers and the twenty thousand new-made graves of that period are fading from our minds, the committee has experienced more or less of difficulty in obtaining the appropriations necessary to enable the Board to perform the important duties which devolve upon it, and, indeed, found it impossible at the last session to obtain adequate appropriations.

The practical question, as it appears to the committee, is, the country being now free from yellow fever and cholera, shall we use the necessary means to keep it so, or relax into indifference, withhold the powers and the necessary means to prevent their importation, and await the outbreak of another epidemic, which will cost the country hundreds of millions of dollars and thousands of the lives of our people, to awaken us to the importance of preventive measures in which the committee believes we can find absolute security?

APPENDIX G.

RESOLUTIONS OF SANITARY ORGANIZATIONS.

From a mass of testimony the following resolutions and petitions of representative sanitary organizations have been selected as expressing the views of the sanitarians and health authorities of the country in regard to the work of the Board.

Resolutions of the American Public Health Association.

INDIANAPOLIS, IND., October 18, 1882.

Resolved, That this association has listened with great interest and satisfaction to the analysis and detail of the work accomplished by the National Board of Health, as furnished by the president of the Board; and that we commend its careful perusal to all upon whom, as legislators or sanitarians, devolves the care of the public health, not only as showing the scope of its faithful and efficient administration, but as suggesting and illustrating the permanent demand there is for a sustained national organization of this general character.

Resolved, That there is a work to be done by such a Board which cannot be done by any local or State board, and which is not, and cannot be, adequately represented or fulfilled by any other branch of the national service, as illustrated in its inspections and inquiries into special conditions so serious as to be national rather than local; in its dealings with yellow fever and small-pox; in its plans for consular health bills from foreign ports and refuge stations for a wide coast range; in its internal care over river and railroad transportation; in its investigations into malaria and other wide-spread causes of disease; in its valuable scientific and practical inquiries into the causes and courses of epidemics; in its comparisons of statistical facts, and in the wide-spread distribution of information most intimately affecting the vital conditions of our whole population.

Resolved, That, while each State and each division of national service may contribute much aid in their respective spheres, we view with regret any curtailment of the functions of a Board so constituted as to represent and unify the health interests of the entire nation.

Resolved, That we counsel the National Board to continue all the work possible under its present restricted appropriations, and await with confidence the extension of its powers of usefulness, and that appreciation of its work for the past and its necessity for the future which can but result from a calm and careful estimate of the safeguards requisite for national health and prosperity.

Resolved, That the confining the work of the Board to cholera, yellow fever, and small-pox is believed to be in the highest degree injudicious. It should have the full powers for investigation of all preventable diseases conferred upon it by its constituting act and be granted the funds necessary for this purpose; and this should be done irrespective of the action which may be taken with regard to quarantine.

Resolved, That the members of the American Public Health Association hereby pledge their individual co-operation in endeavoring to secure such national legislation as shall insure to the National Board of Health such material aid as may be needful in carrying out with the greatest efficiency all measures pertaining to the interest of public health.

Resolved, That the advisory council of this association, representing, as it does, the sanitarians of the various States, be directed to use all laudable efforts to place before the President of the United States and the Congress at Washington and before members of Congress in their several States the very great importance to the welfare of the country of such action by the United States Government as shall increase to the fullest extent the means and powers of usefulness of the National Board of Health.

Resolved, That so long as the United States Government confines its maritime and inland quarantine service to the aiding of State and local boards of health, it is essential, for the best results, that such aid shall be through channels most generally acceptable to State and local boards of health whose co-operation is requisite; and we sincerely believe that the National Board of Health is the channel most generally acceptable.

Resolved, That the president, vice-presidents, and secretary of this association be charged with the duty of securing the complete presentation to the authorities at Washington of the full influence of this association in favor of properly and permanently sustaining the National Board of Health.

Resolved, That the address of the President of the National Board of Health, together with these resolutions, and such other papers or resolutions as relate to this subject, be printed at once in pamphlet form to the number of one thousand.

Resolutions of the Sanitary Council of the Mississippi Valley.

SANITARY COUNCIL OF THE MISSISSIPPI VALLEY,
OFFICE OF THE SECRETARY,
Springfield, Ill., October 23, 1882.

At a special session of the sanitary council of the Mississippi Valley, held in the city of Indianapolis on the 19th day of October, 1882, representatives from sixteen States being present, the following action was had.

On motion of Dr. Baker, of Michigan, the president was authorized to appoint a committee, consisting of one delegate from each State represented in the council, to formulate an expression of opinion with regard to the work of the National Board of Health and the necessity for its continuance—said committee to report at an adjourned meeting to be held at 5.30 p. m.

The president announced the following-named delegates as members of the committee:

Arkansas, D. H. Dungan, M. D.; Illinois, W. M. Chambers, M. D.; Indiana, Thad. M. Stevens, M. D.; Iowa, R. J. Farquaharson, M. D.; Kentucky, John J. Speed, M. D.; Louisiana, L. F. Salomon, M. D.; Michigan, Henry B. Baker, M. D.; Minnesota, D. W. Hand, M. D.; Mississippi, John A. Mead, M. D.; Missouri, W. B. Conery, M. D.; Ohio, T. C. Minor, M. D.; Pennsylvania, W. Snively, M. D.; Tennessee, G. B. Thornton, M. D.; Texas, Hillary Ryan, M. D.; West Virginia, J. E. Reeves, M. D.; Wisconsin, E. L. Griffin, M. D.

The council then adjourned to 5.30 p. m., at which hour it again convened, and the committee appointed at the morning session submitted the following through its chairman, Dr. J. J. Speed, of Kentucky:

Whereas during the three years of its existence the National Board of Health has demonstrated its value and practical utility—

First. By imitating a reform in the principles and practice of maritime quarantine, which, so far as it has been carried out, has resulted in securing the largest measure of protection against the importation of foreign pestilence on the one hand, whilst, on the other, it has freed commerce from the arbitrary and often dangerous detentions, with their consequent costly charges and exorbitant fees, which obtain under the old system.

Second. By its systems of sanitary inspection and supervision of immigrants and of inland transportation by river and rail, whereby the introduction and spread of small-pox and yellow fever have been effectually controlled; the barbarities of the "shot-gun quarantine" abolished; and commercial confidence, business interests, travel, and traffic have been protected against needless interruption and loss through panic and unfounded alarm.

Third. By its researches and investigations into the causes of yellow fever, diphtheria, malarial and other diseases; into the adulterations of food and drugs; into the sources of, and remedies for, air, soil, and water pollution; and into many other problems of sanitary science and preventive medicine, the results of which are already utilized by sanitary engineers, legislators, medical teachers, physicians, and others in promoting human comfort and well-being, in preventing disease and in saving life.

Fourth. By demonstrating the feasibility of so dealing with an infected locality—by temporary depopulation, isolation, and sanitary supervision of its relations with exposed communities—as to secure the prevention of spread of the infection; the limitation of its ravages to the fewest number of victims within the locality itself; and the minimum of disturbance to the interests of threatened regions—results in striking and gratifying contrast to those entailed by a reliance upon so-called *cordons* and other variations of the "shotgun quarantine."

Lastly and importantly. By its relations to state and local boards of health, which have secured co-operation and uniformity of action without regard to State and local boundaries or jurisdiction, to the great advantage of public carriers and other instruments of commerce and to the more efficient protection of the public health, and which also have, *pro tanto*, relieved State and local boards from the necessity and expense of striving to guard against the invasion of disease from without—a necessity for which such boards have neither adequate authority nor means; and

Whereas Congress, at its last session, refused to appropriate the sum (less than

\$100,000) estimated to be necessary to enable the said Board to continue its beneficent labors during another year, thereby avoiding a suspension of many of its most important and useful undertakings.

Whereas it is believed that this refusal of Congress is due to want of familiarity with the work of the National Board, with the practical and economic value of sanitary work generally, and with the sentiment of the public touching these subjects: Therefore be it

Resolved, That the Sanitary Council of the Mississippi Valley earnestly deprecates any effort to curtail the work of the National Board of Health as likely to result in a renewal of panic and unnecessary interference with commerce and travel during several months of the year, aside from any question as to the best and most efficient agency for dealing with an epidemic of contagious disease should such unfortunately occur.

Resolved, That in the judgment of this council, founded upon intimate and extended experience of their practical workings and results, the river and rail inspections of the National Board of Health and its sanitary supervision of immigrants in transit from the seaboard inland, are essential to secure confidence in the Mississippi Valley and the interior States, and thus to prevent avoidable interruption and disturbance of business interests; and the council therefore earnestly petitions Congress to make such immediately available appropriation for this work of the National Board as will enable it to continue, and extend when necessary, its service of sanitary inspections for the prevention of the spread not only of yellow fever and small-pox, but all epidemic, contagious, or infectious diseases.

Resolved, That it is incumbent upon the members of every organization represented in this council to furnish the members of Congress in their respective districts with such information, data, and statistics as may be necessary to a full understanding of the questions involved, confident that such understanding only is wanting to secure for the National Board all necessary appropriations and support from the National Legislature.

Resolved, That this council fully indorses the action of the American Public Health Association as set forth in the resolutions concerning the National Board of Health, adopted at the session of the association, held October 18, 1882.

Resolved, That the secretary of the council be instructed to transmit a copy of the report of the proceedings of this meeting and of the preamble and resolutions to the secretary of the National Board of Health, to the American Public Health Association, and to each organization represented in the council.

At the conclusion of the reading, on motion, the preamble and resolutions were unanimously adopted, and, at the suggestion of the secretary, the delegates present pledged themselves to make every effort to bring the subject directly to the attention of their respective Congressional Representatives.

Official:

<i>Executive committee.</i>	{	GUSTAV DEVRON, M. D. (of Louisiana),	<i>President.</i>
		D. B. HILLIS, M. D. (of Iowa),	<i>Vice-President.</i>
		JOHN H. RAUCH, M. D. (of Illinois),	<i>Secretary.</i>

Resolutions adopted by the Sanitary Council of the Mississippi Valley at Jackson, Miss., April 4, 1883.

Whereas it is the sense of the Sanitary Council of the Mississippi Valley that the National Board of Health possesses to the fullest extent the confidence of the States of the valley: It is, therefore,

Resolved, That a committee be appointed by the president of this council to petition the President of the United States to place the \$100,000 epidemic fund in the hands of the National Board of Health for disbursement, in case its use is demanded.

Resolved, That in case the National Board of Health is deprived of the power of making inspections of persons and freight, when demanded by the local boards of health, certificates issued under the supervision of a representative or representatives of the Sanitary Council of the Mississippi Valley shall be accepted as valid by the boards of health of the Mississippi Valley, provided that said inspections be carried on under the rules and regulations heretofore prescribed by the National Board of Health.

Resolved, That the Sanitary Council recommends that the States of the valley make voluntary contributions, to be expended under the direction of the executive committee of this council, to continue river and rail inspections in the event that no funds are placed in the hands of the National Board of Health for that purpose.

Resolved, That the Sanitary Council recommends for the guidance of the health organizations of this valley the system of inspection, isolation, disinfection, and quarantine heretofore prescribed by the National Board of Health.

Resolved, That the communication of the Louisiana State board of health be received in the spirit in which it is tendered, and that its co-operation with the Sanitary Council of the Mississippi Valley in protecting the valley from epidemic diseases will be cordially approved and acknowledged.

All of which is respectfully submitted.

R. C. KEDZIE,
Chairman.
B. M. GRIFFITH.
W. H. DICKINSON.
JOS. SPIEGELHALTER.
G. B. THORNTON.
J. A. DIBRELL, Jr.
H. G. JONES.
W. T. HYER.
L. C. CARR.
W. W. DANIELS.
D. C. HOLLIDAY.
Secretary.

MEMORIAL TO THE PRESIDENT OF THE UNITED STATES.

Afternoon session of the council, April 4.

The following draft of the memorial to the President of the United States, authorized at the morning session, was submitted by the committee:

To the President:

We, a committee appointed by the Sanitary Council of the Mississippi Valley, at its fifth annual meeting, in the city of Jackson, Miss., April 3-4, 1883, do humbly but sincerely petition that the fund of \$100,000, to be used, with your approval, in the event of an outbreak of yellow fever or other epidemic disease on the coasts of our country, be placed at the disposal of the National Board of Health.

That body can give confidence to the people of the valley as to the necessary precautions and safeguards yearly demanded by the exposure of our Southern ports to ravages of yellow fever. Their inspection stations and the mode their officers have adopted in isolation and disinfection, establishing quarantine only when emergency or occasion demands it, have earned for the National Board a degree of confidence that, of itself alone, is worth millions of dollars to the commerce of the country.

To supplant this body or withhold from it the necessary funds to maintain inspection stations at all exposed points will, in our humble judgment, clog the wheels of commerce by bringing about a feeling of distrust on the first alarm, be it true or false, and cause recourse to the shotgun policy of quarantine, which can but prove destructive to the commercial interests of the Mississippi Valley, which in a measure affect those of the entire Union.

With these views, submitted with full faith in your judgment, and appreciation of the solicitude you must feel for the welfare of the public health, we herewith subscribe ourselves your most humble petitioners.

On motion, the draft of the memorial was approved, and it was ordered to be engrossed and signed by the delegates from the States of Ohio, Indiana, Illinois, Kentucky, Iowa, Tennessee, Missouri, Michigan, Wisconsin, Louisiana, Arkansas, and Mississippi, to be forwarded to the President at Washington.

Petition of the president and secretary of the State board of health of New York to the President of the United States.

APRIL 26, 1883.

To the President:

SIR: The undersigned, as president and secretary of the State board of health of New York, have the honor to invite your attention to the vast concern which is felt for the maintenance of a National Board of Health in the United States; the interests concerned are inter-State, national, and international.

State boards, now 29 in number, are beginning a great work in and for the respective States, and while they widely open permanent channels of national action, the particular functions of the National Board of Health cannot be exercised by any or all of these State boards.

Neither the naval, the military, nor the Marine Hospital Service can, in the least, fill the position and exercise the functions of a national health service. Even with ample means one of those branches of service, with \$100,000 at its command last year, so managed the sanitary measures and responsibility with which it was intrusted in Texas as to merit, as it will long suffer, the derision of the medical authorities in hygiene and sanitary police.

The duty, dignity, and sanitary welfare of the nation seem alike to warrant the conclusion that the National Board of Health should, under the President's advice and orders, be charged with all the duties for which it was called into existence; and that in its relations to the State, inter-State, and international public health interests, the confidence and regard which is entertained for that Board should be sufficient reason for imparting to the Board all the official dignity and right which its high character actually merits.

The nations and people in all lands have good reason to expect such a course to be pursued toward the National Board of Health of the United States. The people of the American States look for it and will demand it. Public hygienists understand the necessity for it, and they, with the statesmen of the nations, point to the fact that contagious pests which are current in the foreign cities and countries are soon current in the United States. Even leprosy of distant lands is among our people, and the fevers and contagia of immigrants are being planted where the migrants move from the Atlantic to the Pacific. The National Board's work and its scientific researches in the arts of disease-prevention are *national*.

The undersigned are aware that the factious and acrimonious opposition and unworthy criticism which sprang up against the National Board some months ago has been used as means for organizing a permanent kind of force against it at Washington; but this must not militate against the continued life and usefulness of that branch of the public service. It has the confidence and ardent good will of the State boards of health and of all the most trusted sanitarians in this country and in Europe.

On their own behalf, as officers charged with great responsibility, and on behalf of a State board whose confidence and moral support have been steadfastly given to the National Board, the undersigned most respectfully and dutifully recommend that the full authority and official right and dignity of that Board be maintained in all its functions, pecuniary resources, and central recognition and support which the President and his Cabinet can secure for it.

The State board of health of New York is believed to feel less direct need of the influence and aid of a National Board, for this State has steadily for three years evinced the spirit and dignity of a nation in dealing with public health questions; yet the Empire State would ask and expect that the National Board be worthy the Republic and be maintained on a footing worthy of it.

This letter is written without request or knowledge of the National Board, at a critical period; just before the anxiety with regard to yellow fever and the repetition of Texas follies of last year may begin.

With the highest respect,

EDWARD M. MOORE,
President.

ELISHA HARRIS, *Secretary.*

The memorial of the board of health of the State of Alabama.

To His Excellency the President of the United States:

We have the honor to represent to your Excellency the following facts:

(1.) That the quarantine station at Ship Island, which has been maintained during the last three years under the management of the National Board of Health, has been of essential use in protecting the Gulf ports of Alabama and Mississippi against invasions of yellow fever.

(2.) That none of these ports have the means of establishing quarantine stations so equipped and conducted as to be able to deal with infected vessels in a thoroughly satisfactory and efficient way by unloading, disinfecting, &c.

(3.) That this want has been supplied to the ports mentioned by the Ship Island station, which has been used by several of them as an inspection station, and by all of them as a refuge station to which infected vessels could be sent for disinfection, detention, and such other treatment as may have seemed necessary.

(4.) That appreciating the great value of this station as an aid to the local quarantines in the ways we have indicated, we should regret very much to see it discontinued.

(5.) That we have been informed that it cannot be continued for want of money to defray the expenses of its maintenance, unless your Excellency should apply to that

object such sum as may be needed out of the \$100,000 appropriated by Congress to assist local authorities in the work of opposing the introduction and spread of epidemics.

(6.) That we therefore respectfully ask that so much of this epidemic fund as may be necessary be appropriated, in such way as to your Excellency may seem best, to secure the continuance of this Ship Island quarantine station during the coming summer.

(7.) That we very cheerfully bear testimony to the efficient and satisfactory way in which this station has been heretofore conducted.

With the hope that your Excellency will give prompt and favorable consideration to this memorial, we have the honor to subscribe ourselves, &c.

Signed by the board.

MOBILE, April 24, 1883.

Resolutions of the Illinois State board of health.

Dr. Haskell presented the following preamble, resolutions, and memorandum, which were unanimously adopted:

NATIONAL BOARD OF HEALTH.

Whereas the act of Congress, approved June 2, 1879, by which the National Board of Health is charged with the duty of co-operating with and aiding State and local boards of health in the enforcement of their rules and regulations to prevent the introduction of contagious and infectious diseases into the United States, and into one State from another, will expire by limitation on the 1st of June, proximo; and

Whereas the said National Board of Health has discharged this duty with so much of success, honesty of purpose, and regard to economy—the specific details of its work being briefly summarized in the appended memorandum—as to conclusively demonstrate the value of a national agency for the protection of the public health: Therefore, be it

Resolved, That the Illinois State board of health earnestly urges upon the Senators and Representatives from this State to obtain, during the present session, the legislation necessary to secure an extension of said act, pending the creation of a permanent national health organization—such legislation to include a provision whereby the unexpended balances of the original appropriations may be re-appropriated and made immediately available for the purposes of said act.

Resolved, That the secretary be, and he hereby is, authorized to transmit a copy of this preamble, resolutions, and appended summary to each Senator and Representative from this State.

MEMORANDUM, TO ACCOMPANY THE PREAMBLE AND RESOLUTIONS OF THE ILLINOIS STATE BOARD OF HEALTH.

The National Board of Health has demonstrated the value and efficiency of the national authority in the protection of the public health—

By initiating a reform in the principles and practice of maritime quarantine, which, so far as it has been carried out, has resulted in securing the largest measure of protection against the importation of foreign pestilence on the one hand, whilst, on the other, it relieves commerce from the arbitrary, and often dangerous, detentions—with their consequent costly charges and exorbitant fees—which obtain under the old system, still largely in vogue.

By its service of sanitary inspection and supervision of immigrants and of inland transportation by river and rail, whereby the introduction and spread of small-pox and yellow fever have been effectually controlled; the barbarities of the “shot-gun quarantine” abolished; and commercial confidence, business interests, and travel and traffic protected against needless interruptions and loss through panic and unfounded alarm.

By its researches and investigations into the causes of yellow fever, diphtheria, malarial and other diseases; into the adulterations of food and drugs; into the sources of and remedies for air, soil, and water pollution; and into many other problems of sanitary science and preventive medicine, the results of which are already utilized by sanitary engineers, legislators, medical teachers, physicians, and others in promoting human comfort and well-being, in preventing disease and in saving life.

By demonstrating the feasibility of so dealing with an infected locality—by temporary depopulation, isolation, and sanitary supervision of its relations with exposed communities—as to secure the prevention of spread of the infection; the limitation of its ravages to the fewest number of victims within the locality itself; and the minimum of disturbance to the interests of threatened regions.

By its relations to State and local boards of health, through which have been secured co-operation and uniformity of action without regard to State and local boundaries or jurisdiction, to the great advantage of common carriers and other agencies of commerce, and to the more efficient protection of the public health; and through which, also, State and local boards have been relieved, *pro tanto*, from the necessity and expense of striving to guard against the invasion of disease from without—a necessity for which such boards, unaided, have neither adequate authority nor means.

Resolutions of the State board of health of West Virginia.

STATE BOARD OF HEALTH OF WEST VIRGINIA,
OFFICE OF THE SECRETARY,
Wheeling, W. Va., January 13, 1883.

Secretary National Board of Health:

SIR: At a meeting of the State board of health of West Virginia, in the city of Wheeling, January 13, 1883, the following preamble and resolutions were unanimously adopted. Your attention is respectfully invited to the sixth resolution, which begs that you will communicate these deliberations to both houses of Congress:

NATIONAL BOARD OF HEALTH.

Whereas the State board of health of West Virginia recognizes the services of the National Board of Health as of very great importance to the prosperity and well being of the country—in this:

First. By protecting the sea-ports from the introduction of contagious and infectious diseases under the act of June 2, 1879, by a regular system of inspection in foreign ports which are habitually and specially dangerous in this connection; by the establishment of refuge stations in aid of local quarantines established by State and county boards of health, where suspected or infected vessels, which cannot be handled by local authorities, may be sent for observation and treatment until in proper condition for admission into their port of entry; and

Second. By establishing a system of inspection on the Mississippi River, which, in the absence of yellow fever from its shores, gives a sense of security to the people of the vast section of country liable to devastation by this disease, thereby preventing panics and shotgun quarantines, which the history of recent years has demonstrated in damage to commerce to be second only to an invasion of the disease; and which has been found efficient in protecting uninvaded localities, while permitting uninterrupted commercial relations; and

Third. By its inspections at the principal ports of immigrant entry and also at various points on lines of through travel by rail, which have been found to lessen the frequency of small-pox developments and outbreaks, and promise, if fully and perfectly carried out, to free the country from this loathsome pest; and

Fourth. By its efforts to obtain prompt information on all subjects connected with public health, the origin and spread of epidemic and contagious diseases, and the collection and publication of mortality records from all countries, special reports, communications, and valuable data bearing upon the public health; and

Fifth. By its investigation into obscure points connected with the relations existing between insanitary conditions of air, water, soil, &c., and the evil effects suggested as consequent thereon; and

Sixth. By its co-operation with and its demonstrated ability to co-ordinate the actions of State boards of health, thereby producing effective action against imported disease and impure and dangerous indigenous conditions which could not otherwise be attained with equal promptitude and certainty: Therefore,

Resolved, That this board earnestly represents to the National Legislature the importance of speedily removing the limitation placed upon the work of the National Board of Health by the 10th section of the act of June 2, 1879, and such other restrictions as have been placed thereon by Congressional action.

Resolved, That the refuge system inaugurated by the National Board of Health should be enlarged to meet the necessities of all unguarded but important portions of the coast line.

Resolved, That the small-pox inspection service be carried out in full as originally planned by the National Board of Health for the prevention of importation by foreign and spread by inter-State travel and traffic.

Resolved, That the National Board of Health Bulletin and other publications of the Board be continued.

Resolved, That the seeming attempt at encroachment upon the great work assigned to the National Board—the establishment of quarantine, &c.—by the Marine Hospital

Service, is greatly to be regretted as tending to destroy the usefulness of both these important arms of service, while increasing, no doubt, the public expense for their support.

Resolved, That a copy of these resolutions be transmitted to the Senators and Representatives of the State of West Virginia, with the request that they be introduced into the two houses of Congress for consideration pending legislation on the public health.

Your obedient servant,

JAS. E. REEVES,
Secretary State Board of Health.

Resolutions of the State board of health of Michigan.

NATIONAL BOARD OF HEALTH.

At a meeting of the Michigan State board of health at Pontiac, Mich., February 1, 1883, the following resolutions relative to the National Board of Health were adopted:

Whereas the work of the National Board of Health has been seriously crippled by reducing its appropriation and by transferring to another branch of the Government service important parts of its legitimate work and means for usefulness—

Resolved, That, in our opinion, no other Government service is so well qualified to perform the health service of the United States as is the National Board of Health, which has shown by its works its ability to do what was assigned to it, and to gain and retain the confidence of sanitarians throughout this country.

Resolved, That we consider it of the highest national importance, as also of great importance to this State, that the National Board of Health shall receive annually an appropriation sufficient to enable it to carry on the important work of protecting the country from the introduction of contagious diseases; of collecting and distributing, for the guidance of State and local boards of health, information relative to the prevalence of diseases, and particularly of contagious diseases, of investigating by specially qualified experts the obscure causes of diseases, and of publishing to the world the results of its studies and investigations, more especially concerning diseases which, like diphtheria and small-pox, spread generally throughout the country.

Resolved, That a copy of this preamble and resolutions be forwarded to each member of Congress from this State.

A correct transcript, so far as relates to this subject, from the proceedings of the State board of health.

HENRY B. BAKER,
Secretary.

Resolutions of the State board of health of Wisconsin.

At a meeting of the State board of health of Wisconsin, held at Madison, January 31, 1883, the following preamble and resolutions were unanimously adopted:

NATIONAL BOARD OF HEALTH.

Whereas, the State board of health of Wisconsin recognizes the fact that the work that has been performed by the National Board of Health since its organization has been of eminent service to the people of this country and to the cause of sanitary science; by its original researches and investigations into the causation of disease, and by the publication thereof; by its service of sanitary inspection, and by its timely and efficient co-operation with State and local boards of health in times of need: Therefore,

Resolved, That, this board earnestly desires that such legislative action may be taken by Congress as will remove the limitations and restrictions heretofore placed upon the work of the National Board, and such as will give to said National Board sufficient means to carry on the work heretofore committed to it.

Resolved, That, in the opinion of this board, the system heretofore adopted by the said National Board of Health for the inspection of emigrants and for the prevention of the spread of contagious diseases by means of emigrants, should be continued and carried out under the supervision of said National Board, and that the publication of the Bulletins of said Board should be maintained.

Resolved, That copies of these resolutions be forwarded to each Senator and Representative from the State of Wisconsin, with the request on behalf of this board that said resolutions be laid before Congress pending legislation which may affect the powers and duties of said National Board of Health.

*Resolutions of the Medical Society of the County of New York.**To our Representatives in Congress :*

The Medical Society of the County of New York appointed a committee with power to prepare and forward to you resolutions concerning the National Board of Health, its work, its continuation, and the annual appropriation for its support.

The committee submitted the following report, which was adopted and ordered sent to the secretary of each county medical society in the State, with the request that these several societies take similar action without delay :

Whereas the several acts of Congress constituting and organizing a National Board of Health, with power to investigate the sources of disease among the people, to prevent the introduction of contagious and infectious diseases into the United States from foreign ports and their spread from one State into another, to co-operate and aid State and municipal boards of health in the control and suppression of epidemic diseases, and to publish a weekly bulletin of the public health of the cities of the United States and of the foreign ports of the world which have commercial relations with this country, were regarded by the medical profession as admirably adapted to secure the aid of the General Government in the prevention of the importation and spread of those foreign pestilences which have so often devastated large portions of the country in spite of the efforts of local boards of health ; and

Whereas the National Board of Health has discharged the important trusts committed to its care with such fidelity and efficiency as to have won the commendations of the financial officers of the Government, and the favor and support of sanitary authorities in this country and Europe ; and

Whereas this society deems it of the greatest importance that the General Government maintain the National Board of Health in all its integrity and efficiency as the great central power of the Government, ready to co-operate and aid State and municipal boards of health in the prevention of the introduction of contagious and infectious diseases into this country and their spread from one State into another, and to perform such other duties as the several acts of Congress impose : Therefore,

Resolved, That this society earnestly request the members of Congress from the State of New York to use their efforts to secure the repeal of the tenth section of the law of June 2, 1879, entitled "An act to prevent the introduction of contagious and infectious diseases into the United States," whereby the act is made to expire on the 2d of June, 1883.

Resolved, That this society also urge the members of Congress from the State of New York to use their efforts to have adequate appropriations made by Congress for the continuance of its work of investigating the causes of disease, of co-operating with State and local boards of health, of carrying on the immigration-inspection service, and of publishing the bulletin.

[SEAL.]

DAVID WEBSTER, M. D.,
President.
ANDREW H. SMITH, M. D.,
Vice-President.
W. H. A. CARPENTER, M. D.,
Secretary.
CHAS. H. AVERY,
Assistant Secretary.
O. B. DOUGLAS, M. D.,
Treasurer.
DANIEL LEWIS, M. D.,
Chairman Board of Censors.
H. B. CONRAD, M. D.,
Secretary Board of Censors.
WALTER R. GILLETTE, M. D.
JOSEPH D. BRYANT, M. D.

Resolutions of the College of Physicians of Philadelphia.

NORTHEAST CORNER THIRTEENTH AND LOCUST,
Philadelphia, February 7, 1883.

MY DEAR SIR : I have the honor to transmit to you the following preamble and resolutions passed unanimously at the stated meeting of the College of Physicians of Philadelphia, held this evening :

Whereas the College of Physicians of Philadelphia has learned with great regret that the hitherto-efficient service of the National Board of Health has been crippled for want of a suitable appropriation from the Congress of the United States :

Resolved, That there is a great work in national sanitation, which the experience

of older communities proves cannot be accomplished by any local or State boards, and which, in order to be well done, *must be done* by the systematic effort of an organization especially devoted to such a service.

Resolved, That the fellows of the College of Physicians of Philadelphia, individually and collectively, urge most earnestly upon the authorities at Washington the great importance of reconsidering their unfavorable action in regard to the National Board of Health, in such manner that this invaluable department of the public service shall be established upon a broad and permanent basis.

Resolved, That copies of these resolutions be transmitted to our Senators and Representatives in Congress, with the request that they be introduced into the House of Representatives and Senate of the United States for consideration pending legislation on matters relating to the public health.

I am, very respectfully, your obedient servant,

RICH'D A. CLEEMANN,
Secretary College Physicians, Philadelphia.

Resolutions of the South Carolina Medical Association.

YORKVILLE, S. C., April 25, 1883.

DEAR SIR: I have the pleasure to communicate to you the following resolutions adopted by the South Carolina Medical Association, now in session at this place:

Resolved, That the South Carolina Medical Association, in its corporate capacity as the State board of health, does hereby express its continued confidence in the National Board of Health for its wise and beneficent efforts to secure sanitary reform and to maintain public hygiene, and that it fully appreciates the great benefits conferred upon the whole country by the "immigrant inspection service," as well as by its general scientific investigations and reports upon the causes of disease, by which the National Board of Health has proved, to the satisfaction of sanitarians, its eminent ability to perform the great work intrusted to it. More especially does this association commend the system of national quarantine refuge stations and inspections as conducted by this Board, and indorses it as better qualified to conduct this important work than any other department of Government service.

Resolved, That this association does most earnestly urge upon and request His Excellency the President to empower the National Board of Health to open and conduct the national quarantine refuge station at Sapelo Sound, and to furnish it with such part of the fund appropriated by Congress "to prevent the spread of epidemic disease" as may be required for this purpose during the coming summer and autumn.

Resolved, That in the opinion of this association it is essential to the safety of our seaports and to the perfecting of our local quarantine system to have this station as a resort for infected vessels bound to the South Atlantic ports. Sapelo Station, being remote from populous trade centers, offers a safe refuge, where the sick and distressed seaman can be humanely treated without danger of spreading disease and desolation to crowded communities.

Resolved, That a copy of these resolutions be sent to His Excellency the President of the United States, and also to the National Board of Health.

I remain, very respectfully, your obedient servant,

JOHN FORREST, M. D.,
Recording Secretary South Carolina Medical Association.
CHARLES SMART, M. D.,
Secretary National Board of Health.

Resolutions of the board of health of Charleston, S. C.

DEPARTMENT OF HEALTH,
City of Charleston, December 1, 1882.

SIR: I have the honor to forward the inclosed resolutions of the board of health of Charleston, adopted at a meeting held November 8, ultimo.

Accompanying are the resolutions of the American Public Health Association,* adopted at their tenth annual session, at Indianapolis, October 18, ultimo.

Very respectfully,

H. B. HORLBECK, M. D.,
City Registrar and Secretary.

J. L. CABELL, M. D.,
President National Board of Health, Washington, D. C.

*For resolutions of American Public Health Association see p. 215.

Whereas the board of health of Charleston recognize the useful and beneficent labors of the National Board of Health in the cause of hygiene and practical sanitation; and Whereas, the board of health of Charleston believe that the National Board of Health has been actuated solely and entirely in their efforts in the cause of the prevention of disease by motives looking to the public good; and

Whereas the board of health of Charleston recognize, among the many steps taken to prevent the introduction of disease into the United States, the establishment of Sapelo Refuge Quarantine Station (on Black Beard Island, on the coast of Georgia, a point to which vessels from infected latitudes, with yellow fever on board, bound for cities on the Atlantic seaboard of the United States, shall repair, especially guarding the ports of Georgia and South Carolina) as a matter of great moment and vital necessity; and

Whereas the board of health has been constantly recipients of information as to quarantine law and procedure from the National Board of Health: Therefore, be it,

Resolved, That the board of health of Charleston indorse the resolutions of the American Public Health Association, adopted October 18, ultimo, at Indianapolis, commendatory of the work and labors of the National Board of Health.

Resolved, That these resolutions, with a copy of the resolutions adopted at Indianapolis, be forwarded to the Senators and Representatives of Congress from South Carolina, with a request that they use every effort in their power to have the National Board of Health rechartered, and to have sufficient funds appropriated as will enable that body to continue their work for the prevention of disease, investigation of disease, publication of all useful facts relating thereto, and thorough and complete equipment of Sapelo Station.

Resolved, That a copy of these resolutions be forwarded to the health authorities of Savannah, with a request that they co-operate in the effort herewith made.

Resolved, That a copy of the above resolutions be forwarded to the National Board of Health and American Public Health Association.

CITY OF CHARLESTON,
Executive Department, December 8, 1882.

I take this opportunity to express the earnest hope that the action of the American Public Health Association will receive the attention it merits, and that the refuge station at Sapelo may be made a permanent institution of the Federal Government, and be maintained with every appointment for its most thorough efficiency. The old adage, "An ounce of prevention is worth a pound of cure," is especially applicable to this remedial measure.

WM. A. COURTENAY, *Mayor.*

Resolutions of the board of health of Memphis, Tenn.

MEMPHIS, TENN., *November 27, 1882.*

At a meeting of the board of health of this city held this day the following resolutions were adopted:

Resolved, That this board of health, fully appreciating the inestimable services of the National Board of Health from its organization, and being especially mindful of its services to this city, both by its exhaustive sanitary survey and valuable recommendations in local sanitary work, and also in the enforcement of its river and railroad inspection service and quarantine offices at times of threatening danger, heartily commends the resolutions indorsing it adopted unanimously by the American Public Health Association at its recent session in Indianapolis, Ind.

Resolved, That the Senators and Representatives from this State in the National Congress are hereby respectfully requested to do what they can to maintain the National Board of Health in all its original integrity, and secure as full an appropriation as may be necessary for that purpose at the present session of Congress.

Resolved, That in adopting these resolutions we but give expression to a very general feeling entertained by others throughout the Mississippi Valley equally interested, and are justified by the position of Memphis in claiming that we represent not only the people of this city, but those of a wide extent of country in this and adjacent States having commercial relations with it, and consequently interested in the maintenance of the sanitary inspection service as enforced by the National Board of Health during the past three summers.

Resolved, That a copy of these resolutions be sent to each member of the National Congress from Tennessee, and also to the secretary of the National Board of Health, at Washington.

G. B. THORNTON, M. D., *President.*
J. H. PURNELL, M. D., *Secretary.*

Resolutions of the Florida Medical Association.

JACKSONVILLE, FLA., January 20, 1883.

DEAR SIR: At a meeting of the Florida Medical Association held in this city 16th and 17th instant the following resolutions were passed:

Resolved, That it is the feeling of the Florida Medical Association, convened in the city of Jacksonville, January 16, 1883, that the work of the National Board of Health has been productive of great good to the public; that its existence imparts a sense of safety to the entire country; that it is a source of comfort and instruction to the majority of the medical profession; and that we regard it at this time as an actual necessity, and approve of all necessary expenditures for the purpose of maintaining its existence.

Resolved, That a copy of these resolutions be furnished our members in Congress, and also a copy to the president of the National Board of Health.

A true copy from the minutes.

Attest:

A. W. KNIGHT, M. D.,
Secretary Florida Medical Association.

JAMES L. CABELL, LL. D.,
President National Board of Health.

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